APPENDIX F

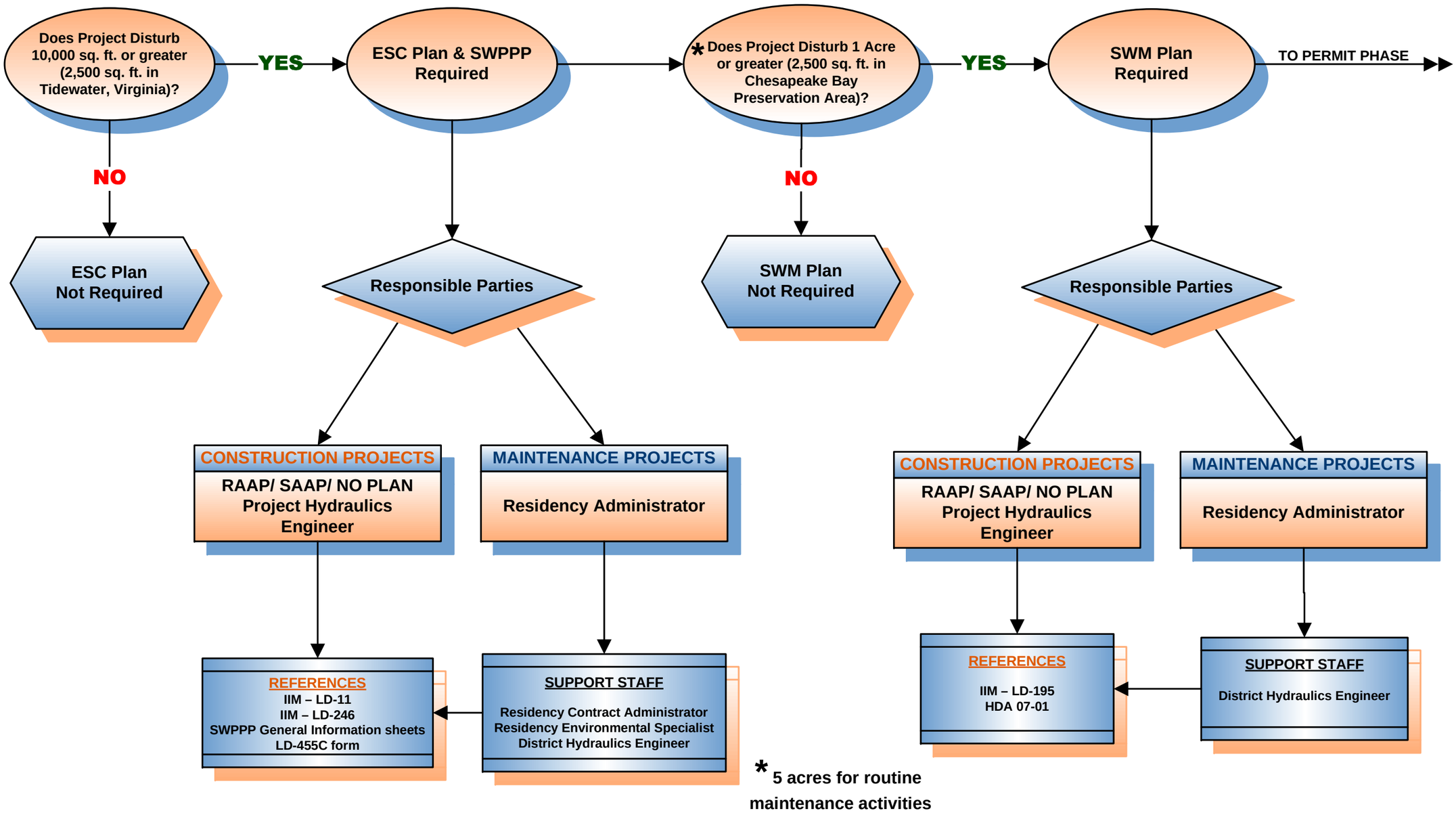
Stormwater Program ESC, SWM, VSMP Construction Permit Requirements Flowchart Instructional and Informational Memoranda

ECS/SWM/VSMP Flow Chart Requirements

IIM-LD-11.26	**Erosion and Sediment Control-Temporary Erosion and Sediment Control Measures to be Incorporated into Plans**
IIM-LD-73.5	**Riprap - Stone Dimensions Soil Survey Construction Procedure**
IIM-LD-110.21	**General Notes**
IIM-LD-122.13	**Roadside Development - Roadside Development Sheet; Coordination; Computing Quantities/Summarization**
IIM-LD-166.4	**Soil Stabilization Mat - Standard EC-3**
IIM-LD-195.7	**(Draft) Post Development Stormwater Management**
IIM-LD-214.2	**Culvert Design**
IIM-LD-228.1	**Sinkholes - Guidelines for the Discharge of Stormwater at Sinkholes**
IIM-LD-242.3	**General Virginia Stormwater Management Program (VSMP) Construction Permit**
IIM-LD-245	**Rural Rustic Roads Projects**
IIM-LD-246.2	**Stormwater pollution prevention plan**

All HDA's are located in the VDOT Drainage Manual

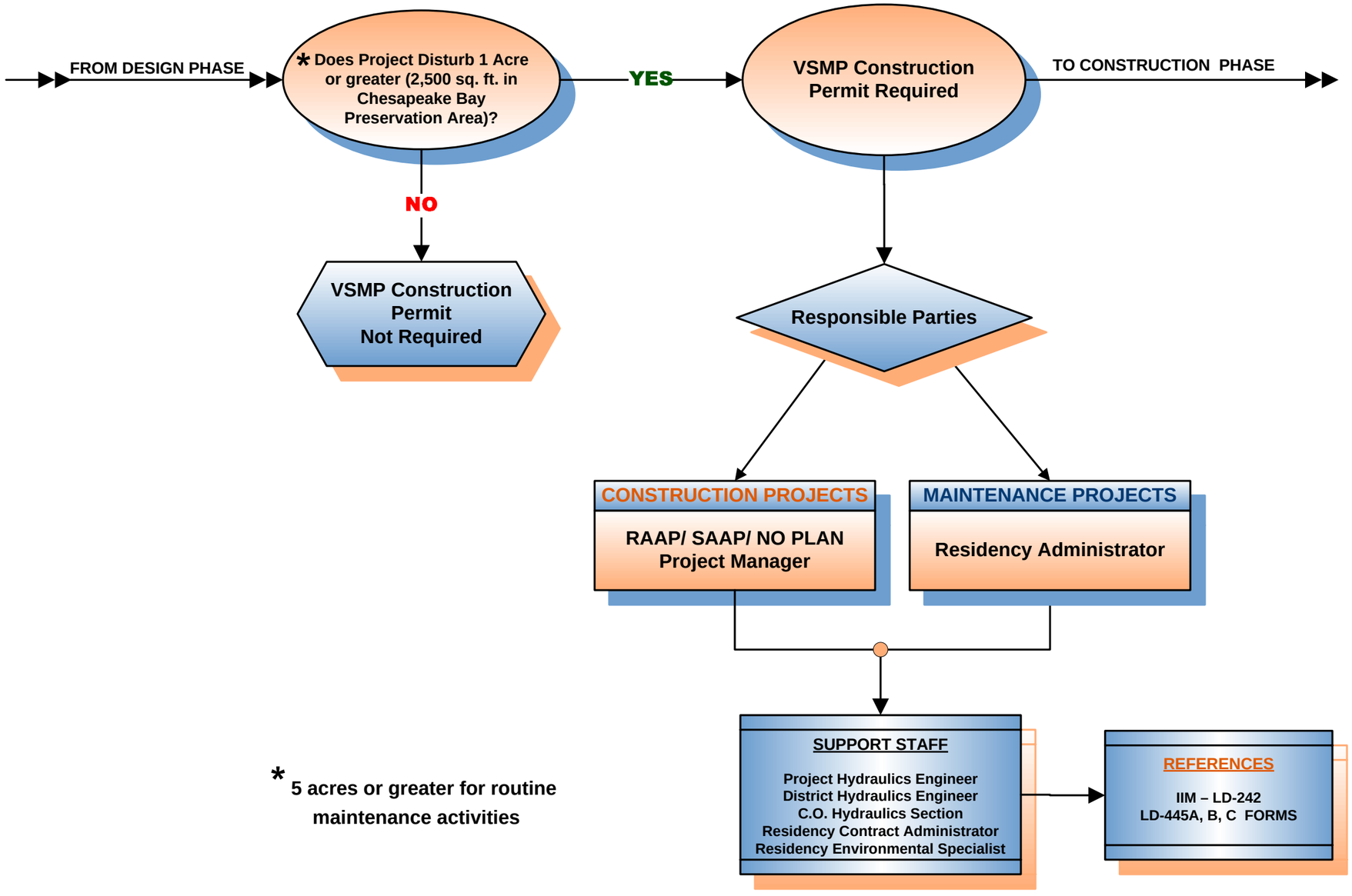
STORMWATER PROGRAM - ESC, SWM, VSMP CONSTRUCTION PERMIT REQUIREMENTS



* 5 acres for routine maintenance activities

PLAN DESIGN PHASE - For Construction and Maintenance Activities

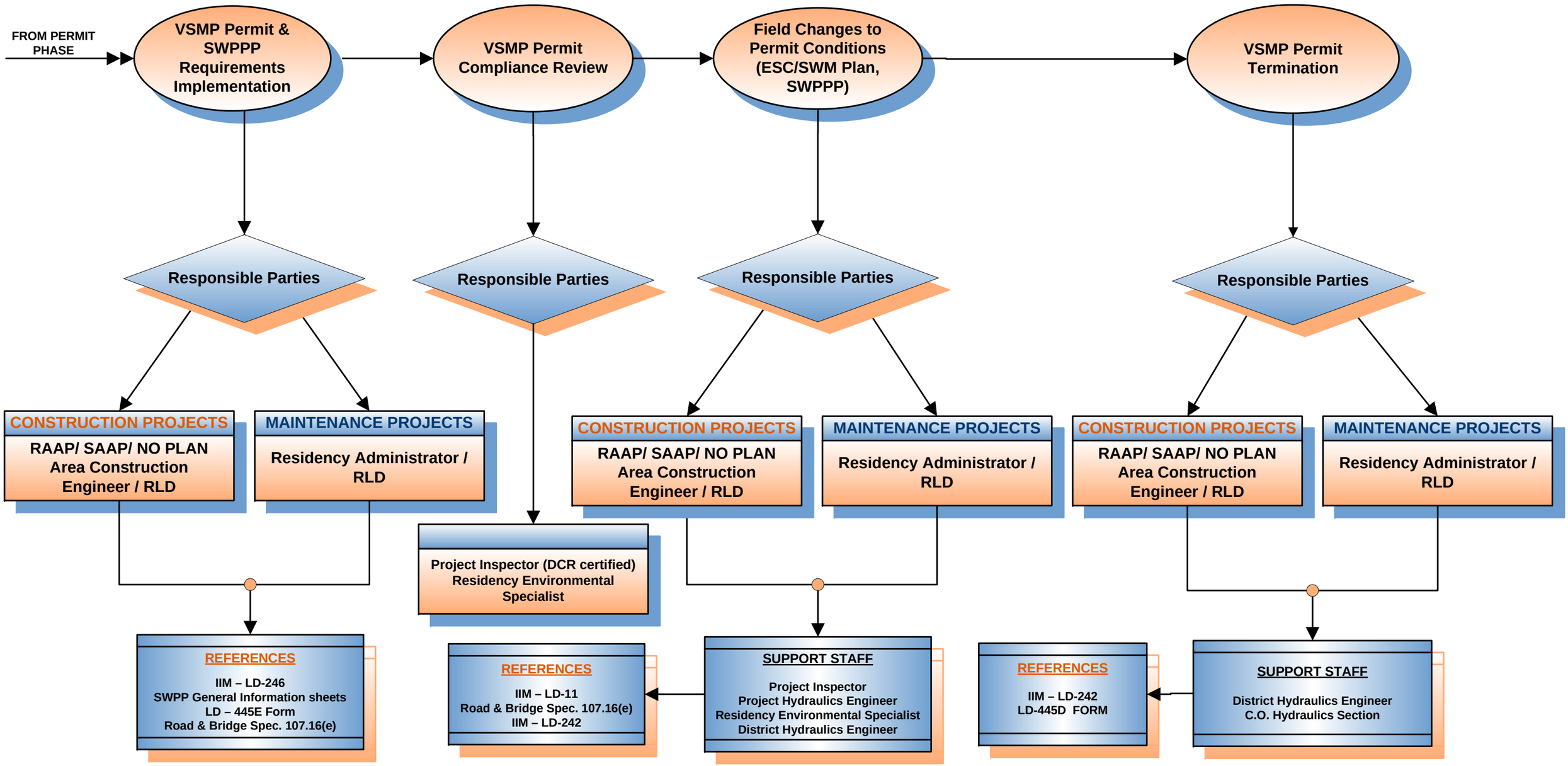
STORMWATER PROGRAM - ESC, SWM, VSMP CONSTRUCTION PERMIT REQUIREMENTS



* 5 acres or greater for routine maintenance activities

VSMP CONSTRUCTION PERMIT PHASE - For Construction and Maintenance Activities

STORMWATER PROGRAM - ESC, SWM, VSMP CONSTRUCTION PERMIT REQUIREMENTS



CONSTRUCTION PHASE - For Construction and Maintenance RLD Activities

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: STORMWATER MANAGEMENT EROSION AND SEDIMENT CONTROL PROGRAM	NUMBER: IIM-LD-11.26
SPECIFIC SUBJECT: PROGRAM ADMINISTRATION AND MINIMUM REQUIREMENTS FOR THE DEVELOPMENT AND IMPLEMENTATION OF EROSION AND SEDIMENT CONTROL AND POST CONSTRUCTION STORMWATER MANAGEMENT PLANS	DATE: MARCH 19, 2010
	SUPERSEDES: IIM-LD-11.25
DIVISION ADMINISTRATOR APPROVAL: Mohammad Mirshahi, P.E. State Location and Design Engineer Approved March 19, 2010	

Changes are shaded.

CURRENT REVISION

- Instructions on the administration, development and implementation of erosion and sediment control and post construction stormwater management plans have been revised to comply with the Virginia Department of Conservation and Recreation's approval of VDOT's Erosion and Sediment Control and Stormwater Management Standards and Specifications and the Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities (VSMP Construction Permit) requirements.

EFFECTIVE DATE

- This memorandum is effective upon receipt.

BACKGROUND

- Program administration details and instructions on the development of erosion and sediment control plans for Standard, Minimum, No Plan, SAAP, Capital Outlay and State Force Construction/Maintenance Projects are contained in this IIM.

- Instructions pertaining to the design criteria and procedures for incorporating erosion and sediment control features into an erosion and sediment control plan and an example of an erosion and sediment control plan for a “No Plan” project are contained in Appendix 10B-1 and 10C-1 in Chapter 10 of the latest version of the VDOT Drainage Manual.

ACRONYMS

- The following acronyms are used within this document:

  - ACE – Area Construction Engineer
  - CA – Contract Administrator
  - CEP – Concurrent Engineering Process
  - DCR – Department of Conservation and Recreation
  - EPA – Environmental Protection Agency
  - ESC – Erosion and Sediment Control
  - ESCCC – Erosion and Sediment Control Contractor Certification
  - FI – Field Inspection
  - HDA – Hydraulic Design Advisory
  - IIM – Informational and Instructional Memorandum
  - PFI – Preliminary Field Inspection
  - PM – Project Manager
  - RA – Residency Administrator
  - R&B – Road and Bridge
  - RLD – Responsible Land Disturber
  - RLDA – Regulated Land Disturbance Activity
  - SLS – Straight Line Sketch
  - SWM – Stormwater Management
  - SWPPP – Stormwater Pollution Prevention Plan
  - TMDL – Total Maximum Daily Load
  - VDOT – Virginia Department of Transportation
  - VSMP – Virginia Stormwater Management Program
  - VTCA – Virginia Transportation Construction Alliance

1.0 PROGRAM ADMINISTRATION

1.1 VDOT receives an annual approval of its ESC Standards and Specifications from DCR. By its annual approval of VDOT’s ESC Standards and Specifications, DCR authorizes VDOT to administer its ESC Program in accordance with the Approved ESC Standards and Specifications, on all regulated land disturbance activities undertaken by the Department.

1.2 VDOT's Approved ESC Standards and Specifications shall apply to all plan design, construction and maintenance activities undertaken by VDOT, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC Law and Regulations. During any inspections of VDOT land disturbing activities by DCR, EPA and other such environmental agencies, compliance with the VDOT's Approved ESC Standards and Specifications (and all parts thereof) will be expected. A standard, specification or product not contained or referenced in VDOT's Approved ESC Standards and Specifications can not be used unless it is submitted to and approved by DCR either as a revision to the Approved ESC Standards and Specifications or a project specific variance.

1.3 Statewide use of standards, specifications or products not contained in VDOT's DCR Approved ESC Standards and Specifications will require a revision to the Approved ESC Standards and Specifications. Any revisions to the Approved ESC Standards and Specifications shall be reviewed and approved by DCR prior to implementation by VDOT. Such review and approval shall be coordinated by the VDOT ESC Program Administrator (State Hydraulics Engineer).

1.4 Where determined necessary to meet an individual project need, VDOT may request DCR to grant a project specific variance to the Approved ESC Standards and Specifications.

1.4.1 All requests for project specific variances for those projects being designed in a VDOT District Office shall be coordinated by the District Hydraulics Engineer with the appropriate DCR Regional Office. All variance requests shall be accompanied by complete details and documentation, including justification for the requested variance. Copies of any variance requests and subsequent correspondence are to be sent to the DCR ESC Program Manager in the DCR Central Office and the VDOT ESC Program Administrator (State Hydraulics Engineer) in the VDOT Central Office. If the VDOT District Office and the DCR Regional Office can not come to agreement on a specific request, or if additional review is necessary, the assistance of the DCR or VDOT Central Office can be requested.

1.4.2 All requests for project specific variances for those projects being designed in the VDOT Central Office shall be coordinated by the State Hydraulics Engineer with the DCR Central Office. All variance requests shall be accompanied by complete details and documentation, including justification for the requested variance.

1.4.3 All requested variances are to be considered unapproved until written approval from DCR is received.

1.4.4 All approved variances shall be listed in Note 1 in Section II of the SWPPP General Information Sheets in the construction plans (or other such documents) for the land disturbing activity (see latest version of IIM-LD-246).

1.4.5 All documentation for and approval of requested variances shall be retained in the appropriate (i.e. design, construction, etc.) files of the proposed activity.

1.5 Non linear projects, such as those administered by the VDOT's Capital Outlay Program, are encouraged to utilize VDOT's Approved ESC Standards and Specifications in the development of the ESC Plan for such projects. Where deemed impractical to use VDOT's Approved ESC Standards and Specifications and when approved by the VDOT ESC Program Administrator (State Hydraulics Engineer), DCR's ESC Standards and Specifications, as outlined in the Virginia Erosion and Sediment Control Regulations and Handbook, may be utilized in combination with VDOT's Approved ESC Standards and Specifications to develop ESC Plans for non linear projects. Such projects include, but are not limited to, new and/or additions/modifications to Rest Areas, District or Residency Office complexes, Area Maintenance Headquarters/Repair Shops and buildings on the right of way or associated with bridges/piers/tunnels, spreader/tailgate/wash rack sites, holding ponds or containment pads, fuel dispensing facilities, security facilities and drainage improvements to building/parking sites and structures.

2.0 DCR CERTIFICATIONS

2.1 The Virginia ESC Law and Regulations require that the ESC Program administration and the ESC Plan design, implementation and inspection activities be conducted by DCR certified personnel for all Regulated Land Disturbance Activities.

2.2 VDOT's ESC Program will be administrated by a DCR Certified Program Administrator.

2.2.1 The Program Administrator shall be the person within the Department who has been designated to have overall responsibility for administration of VDOT's ESC Program.

2.2.2 The DCR Program Administrator Certification is acquired by satisfying the DCR eligibility/training requirements and passing the DCR Program Administrator Exam or by possessing a DCR Combined Administrator Certification.

2.2.3 The State Hydraulics Engineer in the Central Office Location and Design Division is currently designated as VDOT's ESC Program Administrator.

2.3 The Virginia ESC Regulations require that each RLDA be overseen by a DCR certified RLD.

2.3.1 The DCR RLD Certification is required for the VDOT person who has general oversight of the construction phase of a specific RLDA.

2.3.2 The RLD for a specific RLDA must be identified prior to beginning any land disturbance activity (see note 5 in Section I of the SWPPP General Information Sheets referenced in the latest version of IIM-LD-246).

2.3.3 The DCR RLD Certification is acquired by passing the DCR RLD Exam or by possessing a DCR Combined Administrator, Program Administrator, Plan Reviewer or Inspector Certification or by possessing a Professional Engineer, Land Surveyor, Landscape Architect or Architect License pursuant to Chapter 4, Title 54.1, of the Code of Virginia.

2.4 The proposed ESC Plan for each RLDA must be reviewed and approved by a DCR Certified ESC Plan Reviewer to ensure that the ESC Plan has been developed in accordance with VDOT's Approved ESC Standards and Specifications or variances authorized thereto.

2.4.1 The DCR Plan Reviewer Certification is required for any person that has responsibility for reviewing and approving the proposed erosion and sediment control plan for a specific RLDA.

2.4.2 The Certified Plan Reviewer shall be a VDOT employee, or an employee of an engineering consulting firm under contract to VDOT, who has expertise in drainage design and erosion and sediment control design.

2.4.3 The DCR Plan Reviewer Certification is acquired by satisfying the DCR eligibility/training requirements and passing the DCR Plan Reviewer Exam or by possessing a DCR Combined Administrator Certification or by possessing a Professional Engineer, Land Surveyor, Landscape Architect or Architect License pursuant to Chapter 4, Title 54.1, of the Code of Virginia.

2.5 A DCR ESC Inspector Certification is required for those persons having responsibility for ensuring the proper implementation of, or compliance with, the proposed ESC Plan and VDOT's Approved ESC Standards and Specifications, or variances authorized thereto, throughout the construction phase of the RLDA. The ESC Law and Regulations also require that inspections of ESC facilities be conducted by a DCR certified ESC Inspector.

2.5.1 The Certified Inspector shall be a VDOT employee or an employee of an engineering consulting firm under contract to VDOT and who is so identified on the SWPPP Certification form LD-445E (see latest version of IIM-LD-246).

2.5.2 The DCR Inspector Certification is acquired by satisfying the DCR eligibility/training requirements and passing the DCR Inspector Certification Exam or by possessing a DCR Combined Administrator Certification.

2.6 It shall be the responsibility of the Project Authority to ensure that those staff with the appropriate DCR Certifications (RLD, Plan Reviewer or Inspector) perform the functions required by the ESC Law and Regulations and noted in Sections 2.3 through 2.5 of this document.

2.6.1 For the purposes of this document, the Project Authority is defined as that person with overall responsibility of a land disturbing activity or a specific phase of a land disturbing activity.

2.6.2 The Project Authority for preconstruction (design) activities is typically the PM, Residency CA, RA or other such person responsible for the preconstruction phase of the land disturbing activity. This person shall ensure that the proposed ESC Plan has been reviewed and approved by a DCR Certified Plan Reviewer.

2.6.3 The Project Authority for actual land disturbance (construction) activities is typically the ACE, RA or other such person responsible for the construction phase of the land disturbing activity. This person shall ensure that the RLDA has an assigned DCR Certified RLD and that the implementation of the ESC Plan, including inspection requirements, is being overseen/conducted by a DCR Certified Inspector.

3.0 VDOT TRAINING/CERTIFICATIONS

3.1 Where land disturbing activities occurring within VDOT right of way are regulated under the Virginia ESC Law and Regulations, Section 107.16(a) of the 2007 VDOT R&B Specifications requires that all contractors performing such land disturbing activities have a person certified by the VDOT in erosion and sediment control within the project limits. This certification requirement is mandatory for all contractors performing land disturbing activities under contracts managed by VDOT, including PPTA and Design Build agreements. For contractors performing land disturbing activities on VDOT right of way under a Land Use Permit, the certification requirements of Section 107.16(a) shall apply if the area of land disturbance within the VDOT right of way exceeds that noted in Sections 4.3 and 4.4 of this document.

EXCEPTION – Those contractors performing maintenance related land disturbing activities under a hired equipment contract whose work is directly supervised by VDOT personnel.

3.1.1 Successful completion of the Department's "Erosion and Sediment Control Contractor Certification" course satisfies the certification requirements of Section 107.16 (a) of the 2007 VDOT R&B Specifications.

3.1.2 The ESCCC is a joint training effort between the VDOT and the VTCA. The VDOT develops the course material and the VTCA administers the training, testing and issuance of certifications.

3.2 The VDOT "In Stream Maintenance Training" course is required training for all VDOT personnel performing or supervising maintenance activities, where such activities are regulated under the Virginia ESC Law and Regulations.

3.2.1 The “In Stream Maintenance Training” course is developed and administered by the VDOT’s Central Office Environmental Division.

3.2.2 The “In Stream Maintenance Training” course consists of several modules that are targeted toward best management practices for working in and around streams and other environmentally sensitive areas and controlling erosion and sedimentation associated with land disturbance on maintenance activities.

3.2.3 The “In Stream Maintenance Training” course is designed to be conducted at the local level (i.e., Residency, Area Maintenance Headquarters, etc.) by the Residency Environmental Specialist or other such person. The modules can be taught individually in short group meetings or several modules can be combined and taught at a more formal training session. A web based training option is available in the VDOT University Virtual Campus.

4.0 POLICY/GENERAL GUIDELINES

4.1 Requirements of the Virginia ESC Regulations and the VDOT ESC Standards and Specifications, as approved by the DCR and described herein, shall be incorporated into all erosion and sediment control designs and shall be enforced on all Regulated Land Disturbance Activities managed by VDOT.

4.2 When requested by DCR, and where deemed practical by VDOT, projects located in jurisdictions with more stringent ESC technical criteria than that contained in the Virginia ESC Law and Regulations shall be designed to meet the more stringent criteria. The local criteria may be part of a locally adopted State approved program or may be part of a watershed initiative related to the protection of a water supply, a TMDL implementation plan, or a Tributary Strategy Plan. It will be the responsibility of the ESC Plan Designer to demonstrate, through appropriate analysis and documentation, that the local requirements are not practical for the project under consideration. Early coordination should occur between the ESC Plan Designer and the local ESC program authority in order to identify any such requirements.

4.3 Any maintenance or construction activity disturbing 2,500 square feet (232 m^2) or greater within the area of Tidewater, Virginia, as defined in the Virginia Chesapeake Bay Preservation Act, must have a project specific ESC Plan developed and implemented in accordance with the VDOT’s Approved ESC Standards and Specifications. Tidewater, Virginia is defined as the Counties of Accomack, Arlington, Caroline, Charles City, Chesterfield, Essex, Fairfax, Gloucester, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Matthews, Middlesex, New Kent, Northampton, Northumberland, Prince George, Prince William, Richmond, Spotsylvania, Stafford, Surry, Westmoreland and York and the Cities of Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls

Church, Fredericksburg, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Poquoson, Portsmouth, Richmond, Suffolk, Virginia Beach and Williamsburg.

4.4 Any maintenance or construction activity disturbing 10,000 square feet (929 m^2) or greater in areas other than those within Tidewater, Virginia (as defined in Section 4.3 of this document) must have a project specific ESC Plan developed and implemented in accordance with VDOT's Approved ESC Standards and Specifications.

4.5 The Virginia ESC Law defines land disturbance as any land change which may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands of the Commonwealth, including, but not limited to, clearing, grading, excavating, transporting and filling of land.

4.6 The blading/dragging/grading associated with the maintenance of the travel surface of an unpaved roadway is considered a land disturbance.

4.7 VDOT shall be responsible for ensuring compliance with its approved ESC Standards and Specifications by private entities (i.e., agents, contractors, subcontractors, consultants) conducting regulated land disturbance activities on projects managed by VDOT, including those constructed under the Public/Private Transportation Act (PPTA), the Design/Build process and the Capital Outlay Program.

4.8 When not included in the proposed ESC Plan for the RLDA, the contractor must provide an ESC Plan in accordance with Section 106 of the 2007 VDOT R&B Specifications for borrow pit sites and disposal area sites utilized exclusively to obtain or dispose of project materials. Any such ESC Plan provided by the contractor must comply with VDOT's Approved ESC Standards and Specifications. Where required, the contractor must design, construct and maintain sediment traps and/or basins at these sites. The contractor shall supply supporting calculations for sediment trap and/or basin design and calculations demonstrating compliance with the Virginia ESC Regulation MS-19 for an adequate receiving channel. All information provided by the contractor should be reviewed by the District Hydraulics Engineer or other appropriate VDOT personnel to ensure accuracy, the use of appropriate methodology and compliance with VDOT's Approved ESC Standards and Specifications, Virginia ESC Law and Regulations, and VSMP Construction Permit Conditions (where applicable).

5.0 MINIMUM REQUIREMENTS FOR ALL EROSION AND SEDIMENT CONTROL PLANS

5.1 The ESC Plan shall include a plan view depicting (using appropriate plan symbols and notes) locations where specific measures are needed in order to control erosion

and sediment deposition within the RLDA limits. Specific erosion and sediment control measures include, but are not limited to, protective linings for ditches, pipe outlet protection, filter barrier, silt fence, check dams, silt traps, sediment traps, sediment basins, diversion berms and ditches, etc. The ESC Plan should be based on the existing field conditions at the time of design, the anticipated sequence of construction, and the site conditions expected as the RLDA is brought to final grade.

5.2 Erosion and Sediment Control Plan Information:

General information related to the ESC Plan is to be documented utilizing the notes in Section I, II and III of the SWPPP General Information Sheets (see the latest version of IIM-LD-246). Information required to complete the SWPPP notes will be developed by the ESC Plan Designer with assistance from District Hydraulics or Residency staff as needed.

5.3 Sequence of Construction

The proposed ESC Plan shall be developed in conjunction with the proposed Sequence of Construction Plan and should denote the required erosion and sediment controls for the intended sequence of major construction activities. In planning the sequence of construction, consideration should be given to elimination or minimization of the need for major erosion and sediment control facilities, such as sediment basins, by strategic planning of the construction timing and location of erosion and sediment control measures, grading operations, temporary and permanent channels and drainage facilities. Any changes to the proposed sequence of construction plan that could potentially cause a significant change to the proposed ESC or related Drainage Plan shall be submitted to the ESC Plan Designer/Hydraulics Engineer for evaluation of impacts.

5.4 Contents of ESC Plan

Details of the RLDA'S ESC Plan may be shown on, but is not limited to, the plan, profile, typical section and detail sheets of the construction plan set or other such documents. The ESC Plan shall, at a minimum, contain the following information:

5.4.1 Section I, II and III notes of the SWPPP General Information Sheets (see latest version of IIM-LD-246).

5.4.2 Limits of clearing and grading (plan view and typical section).

5.4.3 Location of temporary and permanent erosion and sediment control and related permanent stormwater management features (plan view).

5.4.4 Construction details for any temporary or permanent erosion and sediment control or related permanent stormwater management features if different from the VDOT R&B Standards and Specifications.

5.4.5 Location of any surface waters, wetland features, or other environmentally sensitive/critical areas within or immediately adjacent to the RLDA area. (Such features located within close proximity of the project, yet outside the limits of the construction plans or other such documents, shall be described in Note 6 in Section I of the SWPPP General Information Sheets (see latest version of IIM-LD-246).

5.4.6 Appropriate existing and proposed topographic features.

6.0 PLAN DEVELOPMENT PROCESS

6.1 Concurrent Engineering Process for Plan Development

The CEP for plan development incorporates the principles of teamwork, flexibility, and milestones. The development, review, and approval of the project specific erosion and sediment control plan is included in the CEP milestones as follows:

6.1.1 Scoping Stage
The ESC Plan Designer/Hydraulics Engineer shall identify any local ESC or related SWM technical criteria or watershed initiatives that may influence the ESC or related post construction SWM design of the project. This should include early coordination with the local ESC/SWM program authority to assess any potential impacts on the project design.

6.1.2 PFI/Public Hearing Stage
The ESC Plan Designer/Hydraulics Engineer shall develop preliminary ESC and associated post construction SWM Plans (see the latest version of IIM-LD-195 for information on the technical criteria and requirements for permanent SWM facilities) and show locations of all major erosion and sediment control, permanent stormwater management, and/or drainage facilities on the plans that may affect the required right of way. Members of the project team shall provide comments, as appropriate, to the ESC Plan Designer/Hydraulics Engineer regarding the preliminary plan, including any pertinent information that might affect the final design of the ESC or post construction SWM Plan.

6.1.3 FI Stage
Prior to the FI, the ESC Plan Designer/Hydraulics Engineer shall develop final ESC and associated post construction SWM plans and show final design locations, sizes, and other plan details as necessary to accurately determine the right-of-way and/or easement requirements, and to determine whether the selected ESC Plan Concept (see Section 6.5 of this document) is appropriate. The ESC and related post construction SWM Plan design shall address any comments or recommendations from the Public Hearing process as accepted/incorporated by the Project Manager (or other such project

authority). This phase of the ESC and related post construction SWM Plan design process provides all the necessary information needed to conduct a thorough Field Inspection. Members of the project team shall provide comments, as appropriate, to the ESC Plan Designer/Hydraulics Engineer regarding the proposed ESC and post construction SWM Plan.

6.1.4 ESC Plan Design Completion

After FI and prior to the Right of Way stage, the ESC Plan Designer/Hydraulics Engineer shall incorporate all changes, deletions, and/or additions into the ESC and related post construction SWM Plan resulting from any FI and/or Quality Control Review comments or plan revisions. The ESC and post construction SWM Plan shall be carefully reviewed for compliance with the approved VDOT ESC and SWM Standards and Specifications and the VSMP Construction Permit (where applicable) including, but not limited to, the types of proposed measures, means of access for maintenance, and required right of way and/or easements.

6.1.5 ESC & SWM Plan Design Certification

Prior to the Pre-Advertisement Conference (or similar project meeting), the ESC Plan Designer/Hydraulics Engineer shall have the ESC and related post construction SWM Plan reviewed by a DCR Certified ESC Plan Reviewer. The ECS Plan Reviewer shall verify that the ESC and related post construction SWM Plan for the project is in compliance with the VDOT Approved ESC and SWM Standards and Specifications. Any comments by the Plan Reviewer shall be addressed with the ESC Plan Designer/Hydraulics Engineer. Once all comments have been reconciled, the ESC Plan Reviewer completes, signs and forwards the ESC & SWM Plan Design Certification Form (LD-445C) to the ESC Plan Designer/Hydraulics Engineer. The ESC Plan Designer/Hydraulics Engineer provides the completed LD-445C form to the Project Manager (or other such project authority) for use in the VSMP Construction Permit Application Process (see the latest version of IIM-LD-242), if applicable. A copy of the completed LD-445C form is to be retained with the other documentation for the proposed ESC Plan.

6.2 Plan Development Process for “No Plan” Projects and Special Advertisement and Award Process (SAAP) Projects

6.2.1 A “No Plan” project is defined as an assembly of letter size sketches and narratives depicting the project’s location, typical cross section, estimated quantities and any other specific details necessary (i.e., ESC and/or post construction SWM plans) for the construction of the project. Any “No Plan” project that disturbs 2,500 square feet (232 m^2) or greater in Tidewater, Virginia or 10,000 square feet (929 m^2) or greater elsewhere within the State must have a project specific ESC Plan. A project developed under the “No Plan” concept is one that generally requires little or no survey, engineering or hydraulic analysis in order to produce the necessary contract documents. Any required right of way is generally acquired through donations in lieu of the purchase/condemnation process. See Appendix A of the *VDOT Road Design Manual* for additional information on the “No Plan” concept.

6.2.2 "SAAP" Projects are defined as those advertised under the Special Advertisement and Award Process. The "No Plan" concept is generally used to produce the required contract documents. "SAAP" projects generally have one or more of the following characteristics:

- They require little or no preliminary engineering.
- They are standard maintenance repair contracts (e.g., bridge, guardrail or concrete pavement repairs).
- They are standard incidental construction and/or improvement projects of limited scope.
- The work being performed involves a singular function or specialty work (e.g., bridge painting, pavement markings or pipe installation).

Any "SAAP" project that disturbs 2,500 square feet (232 m^2) or greater in Tidewater, Virginia or 10,000 square feet (929 m^2) or greater elsewhere within the State must have a project specific ESC Plan.

6.2.3 During the early stages of the preparation of the contract assembly for any "SAAP" or "No Plan" Project, the Contract Administrator (CA) (or other such project authority) should conduct a Scoping Meeting to determine what is needed on the project in order to comply with the VDOT Approved ESC and SWM Standards and Specifications. This should include filling out form LD-439 to the extent possible.

The Scoping Meeting should include the CA, the District L&D Engineer and/or Hydraulics Engineer, and the appropriate District Environmental Section personnel in order to accurately determine the project requirements.

6.2.4 The CA, with the assistance of the District Hydraulics Engineer, or other appropriately qualified personnel, shall prepare a preliminary Straight Line Sketch (SLS) in accordance with the instructions on Form LD-438.

6.2.5 Upon completion of the Preliminary SLS, the CA shall coordinate with the appropriate personnel in the District Hydraulics Section and other appropriate District/Residency sections to schedule a Field Review. The following data should be made available to all Field Review participants:

- A completed form LD-439.
- A Vicinity Map – United States Geological Survey (USGS) Topographical Map and County Road Map showing the location and limits of the proposed project.
- A SLS of the project prepared in accordance with the instructions on form LD-438, showing the project limits and the approximate location of proposed drainage items and erosion and sediment control items.

6.2.6 If during the Field Review it is found that such items as permanent stormwater management facilities, drainage improvements, temporary sediment basins or temporary sediment traps are required, the District Hydraulics Section will determine and request the necessary survey data, and provide engineering support in the development of the SLS to ensure consistency with the VDOT Approved ESC and SWM Standards and Specifications.

6.2.7 Upon completion of the design of any required permanent stormwater management facilities, drainage improvements, or sediment trapping facilities, the District Hydraulics Section will provide the CA with final comments, recommendations and plan details.

6.2.8 Final approval of the SLS:

- Upon incorporation of all the required revisions, a DCR Certified ESC Plan Reviewer shall make a final review of the ESC and post construction SWM Plan (if applicable). Once any Plan Reviewer comments have been reconciled with the ESC Plan Designer/Hydraulics Engineer, the Plan Reviewer shall complete and sign the LD-445C Erosion and Sediment Control and Stormwater Management Certification form and forward it to the CA for use in the VSMP Construction Permit Application Process (see the latest version of IIM-LD-242), if applicable. A copy of the completed LD-445C form is to be retained with the other documentation for the proposed ESC Plan.

- The CA will incorporate the final SLS into the contract assembly.

- Thereafter, any significant change to the project that may impact the ESC, post construction SWM, or Drainage Plan will require resubmission of the revised SLS to the ESC Plan Designer and/or District Hydraulics Engineer for review and approval prior to implementation.

6.2.9 The final version of the SLS, the SWPPP General Information Sheets (See latest version of IIM-LD-246) and any Construction Notes will serve as the ESC and post construction SWM Plan for the project. During the construction phase of the project, a copy of the ESC and post construction SWM Plan (Record Set) and all other SWPPP documents shall be kept on the project site and in the project file at the appropriate District/Residency Office as documentation that all policies and procedures have been addressed with regards to the post construction SWM, ESC and SWPPP requirements of the project. During construction, any authorized changes to the proposed ESC Plan necessitated by unforeseen conditions or other circumstances shall be documented on the Record Set in accordance with Section 107.16(e) of the 2007 VDOT R&B Specifications.

6.3 Plan Development Process for State Force Construction Projects

6.3.1 State Force Construction Projects include land-disturbing activities that are performed with state force equipment and/or hired equipment.

6.3.2 Residency personnel are to contact the Residency Environmental Specialist and/or the District Hydraulics Engineer to review any State Force Construction Projects to determine if the proposed work is of a magnitude that may require drainage improvements, an ESC Plan, a post construction SWM Plan, and/or a SWPPP. If it is determined that any of these items are needed, the same procedures outlined in Section 6.2 of this document shall be followed.

6.4 Plan Development Process for Minimum Plan and Standard Plan Construction Projects

6.4.1 Minimum Plan projects are those that require a limited amount of survey information in order to perform the necessary engineering studies and to provide the information required to secure the necessary rights of way. The minimum amounts of detail needed to address environmental requirements and to construct the project are provided in a standard plan assembly format. See Appendix A of the *VDOT Road Design Manual* for additional information on the Minimum Plan concept.

6.4.2 Standard Plan Projects are those that require complete survey information in order to perform the necessary detailed engineering studies and to develop a complete and detailed construction plan assembly.

6.4.3 Projects developed under the Minimum and Standard Plan concepts must have an ESC plan and a SWPPP (see the latest version of IIM-LD-246) if they exceed the land disturbance threshold amounts noted in Sections 4.3 and 4.4 of this document. In addition, such projects may also require a post construction SWM Plan (see the latest version of IIM-LD-195 for applicability and technical criteria and requirements). These plan assemblies should be developed consistent with the steps identified under the Concurrent Engineering Plan Development process described in Section 6.3 of this document.

6.5 The ESC Plan shall be developed utilizing either a single phase or a multiple phase concept. The decision as to which concept to use in the development of the ESC Plan for each specific RLDA shall be determined by the ESC Plan Designer/Hydraulics Engineer and the Project Manager (or other such project authority) during the initial stages of plan development.

6.5.1 Single Phase ESC Plan Concept

6. 5.1.1 The Single Phase ESC Plan concept may be used on minor construction projects where all of the erosion and sediment control measures can be clearly depicted on the construction plan sheet (e.g., rural secondary project, minor urban widening project, bridge and approach project, etc.)

6.5.1.2 The ESC Plan shall address both those items requiring installation prior to the beginning of grubbing operations or the installation of major drainage structures and those items to be installed as grading operations and installation of minor drainage facilities progress. The ESC Plan shall contain or be accompanied by, at a minimum, all those items identified in Section 5.4 of this document (Contents of an ESC Plan).

6.5.1.3 In addition to standard plan symbols, supplemental notes/narratives may be used to clearly define the intent and purpose of the proposed erosion and sediment control measures and to define their sequence of installation. Some standard construction notes and symbols have been developed and are included as a part of the VDOT CADD Cell and Custom Line Style Library and the Geopak Road Plan View Labeler.

6.5.2 Multiple Phase ESC Plan Concept

6.5.2.1 The Multiple Phase ESC Plan concept shall be used on construction projects where additional plan sheet(s) are needed in order to clearly depict the erosion and sediment control measures required at the various stages of construction (e.g., rural multi-lane roadway projects, major urban roadway projects, roadway projects on new locations, roadway projects through environmentally sensitive areas, etc.).

6.5.2.2 In addition to standard plan symbols, supplemental notes/narratives may be used to clearly define the intent and purpose of the proposed erosion and sediment control measures and to define their installation sequencing. Some standard construction notes and symbols have been developed and are included as a part of the VDOT CADD Cell and Custom Line Style Library and the Geopak Road Plan View Labeler.

6.5.2.3 Projects may be developed using the Multiple Phase concept on only those portions of the project that require greater detail and clarity than that provided by the Single Phase concept (e.g., construction in environmentally sensitive areas or major waterway areas, areas where plan clutter reduces the ability to clearly show the erosion and sediment control items, and where grading operations are required prior to installation of major temporary ESC measures or permanent drainage improvements).

6.5.2.4 At a minimum, the multiple phase ESC Plan should be developed in two phases:

- Phase I for those items that need to be installed prior to the beginning of grubbing operations or the installation of major drainage structures.

- Phase II for those items that need to be installed as grading operations and installation of minor drainage facilities progress.

6.5.2.5 Projects with complex grading operations and/or sequence of construction plans may warrant additional ESC Plan Phases to clearly identify all required ESC items.

6.5.2.6 Generally, the Phase I and the Phase II plan details (including associated narratives or notes) should each be depicted on a separate plan sheet following the applicable construction plan sheet (e.g., Construction Plan Sheet 5, Profile Sheet 5A, ESC Phase I Plan Sheet 5B, ESC Phase II Plan Sheet 5C).

6.5.2.7 When found appropriate, the Phase I and Phase II plan details may be depicted on a single plan sheet following the applicable construction plan sheet (e.g., Construction Plan Sheet 5, Profile Sheet 5A, ESC Phase I & II Plan Sheet 5B).

6.5.2.8 In general, when utilizing a separate plan sheet for the Phase I and the Phase II plan details, erosion and sediment control items (including protective linings in permanent ditches and channel relocations) depicted on the Phase I Plan Sheet should not be duplicated on the Phase II Plan Sheet. Temporary erosion and sediment control items depicted on the Phase I & II Plan Sheets should not be duplicated on the Construction Plan Sheet. Permanent drainage improvements identified for completion in Phase I, such as culverts, channels, etc, should also be shown on the Phase II plan.

6.5.2.9 The ESC Phase I Plan Sheet shall, at a minimum, depict the following:

- Existing contours and appropriate existing hydraulic and topographic features as referenced in the Survey File.
- Proposed centerline, edges of pavement and construction limits.
- Permanent drainage culverts, temporary diversion channels and permanent channel relocations (including any protective linings required) involving natural drainage ways that would be constructed or installed prior to the start of grading operations.
- Temporary Sediment Basins (including grading contours, if applicable) that are to be constructed in the initial phases of the grading operations.
- Permanent stormwater management basins (including grading contours, if applicable) that will be utilized as temporary sediment basins and that are to be constructed in the initial phases of the grading operations.
- Diversion dikes, berm ditches and other perimeter ditches (including any required protective linings) that need to be installed prior to the start of grubbing or other earth moving operations.

- Temporary sediment traps, filter barriers, silt fences, rock check dams, turbidity curtains and any other perimeter controls that need to be installed prior to the start of grubbing or other earth moving operations.
- Any necessary construction notes/narratives (to include the need/location for items not typically shown on the plan view such as temporary slope drains, construction entrances, etc.).

6.5.2.10 The Phase II Plan Sheet shall, at a minimum, depict the following:

- Proposed centerline, edges of pavement and construction limits.
- Any permanent drainage culverts and channel relocations involving natural drainage ways installed under the Phase I Plan.
- Temporary sediment basins and permanent stormwater management basins installed under the Phase I Plan.
- All culverts, storm sewer pipe, drop inlets and associated drainage structures that will be installed as grading operations progress.
- All required protective ditch linings (e.g., Standard EC-2 or EC-3, concrete, riprap, etc.), paved flumes and associated structures that will be installed as grading operations progress.
- Temporary sediment traps, filter barriers, silt fences, rock check dams, drop inlet silt traps, and any other erosion and sediment control measures needed to be installed as grading operations progress.

- Any necessary construction notes/narratives (to include the need/location for items not typically shown on the plan view such as temporary slope drains, construction entrances, etc.).

6.5.2.11 The following drainage items from the Phase I and II Plan Sheets shall be depicted on the Construction Plan Sheet:

- Permanent drainage culverts, storm sewer systems, drop inlets and associated structures.
- Permanent channel relocations involving natural waterways.
- Permanent stormwater management facilities.
- Rock checkdams that will be left in place after construction to serve as a permanent stormwater management structure.

7.0 COMPUTATIONS

7.1 All computations to support the ESC and related post construction SWM Plan, and the drainage design plan, including the drainage area map, shall be developed in accordance with the instructions contained in the VDOT Drainage Manual, Hydraulic

Design Advisories, related Informational and Instructional Memoranda, and Drainage Design Memoranda, and shall be made part of the project file and the SWPPP for the land disturbance activity.

8.0 FIELD REVISIONS AND EVALUATIONS

8.1 The ESC Plan must be fully and effectively implemented throughout the entire construction phase of the project.

8.2 During the construction phase of the project, the Project Engineer the Project ESC Inspector, and the contractor shall continuously evaluate the project for areas that may require the deletion/addition/modification of the proposed erosion and sediment control measures/plan in order for the project to remain in compliance with the approved VDOT ESC Standards and Specifications, the Virginia ESC Law and Regulations, and the VSMP Construction Permit conditions (where applicable). Changes in the proposed ESC Plan may be needed due to unforeseen site conditions, contractor scheduling, changes in the proposed sequence of construction or other factors unknown at the time of the development of the proposed ESC Plan.

8.2.1 Minor changes to the proposed ESC Plan (e.g., deletion/addition/modification to non-engineered items such as filter barrier, silt fence, check dams, inlet protection, etc.) may be approved/authorized by the VDOT DCR Certified Inspector and/or the designated RLD for the activity.

8.2.2 When changes to the proposed ESC Plan require detailed hydrologic/hydraulic engineering analysis/calculations (e.g., deletion/addition/modification to engineered items such as sediment traps, sediment basins, etc.), the Project Engineer and/or the Project ESC Inspector shall coordinate a site inspection with the District Hydraulics Engineer and/or the ESC Plan Designer/Hydraulics Engineer. The site inspection should be used to assemble detailed notes, sketches, and photographs to formally document the need for ESC Plan changes. The ESC Plan Designer and/or Hydraulics Engineer will provide the appropriate engineering analysis to document the required changes and to ensure the ESC Plan's continued compliance with the approved VDOT ESC Standards and Specifications, Virginia ESC Law and Regulations, and VSMP Construction Permit conditions (where applicable).

8.2.3 Any authorized changes to the proposed ESC Plan must be noted on a designated plan set (Record Set) which shall be retained on the project site and made available upon request (see Section 107.16(e) of the 2007 VDOT R&B Specifications).

8.3 During the construction phase of the project, the Project Engineer and/or the Project ESC Inspector will periodically, upon request, provide the ESC Plan Designer and/or Hydraulics Engineer with a detailed evaluation report that notes the success or failure of the proposed erosion and sediment control measures depicted in the construction plans (or other such documents) and/or the implementation of different measures as a result of new technologies/products. The VDOT ESC Program Administrator (State Hydraulics Engineer) is to be provided a copy of all such reports.

9.0 MAINTENANCE

9.1 Maintenance of the erosion and sediment control items must be continually provided during the duration of the land disturbance activity.

9.2 The inspection and maintenance of all temporary and permanent erosion and sediment controls shall be conducted in accordance with Sections 107.16 and 303.03 of the 2007 VDOT R&B Specifications.

9.3 Accumulated sediment shall, at a minimum, be removed from erosion and sediment control facilities in accordance with Section 303.03 of the 2007 VDOT R&B Specifications.

10.0 STANDARD FORMS

LD-438	Guidelines for Development of Erosion and Sediment Control and Stormwater Management Plans for Projects with Straight Line Sketches
LD-439	Drainage Information Sheet
LD- 445C	Erosion and Sediment Control and Stormwater Management Plan Certification Form

For the current version of these forms, see the VDOT extranet site at: http://www.extranet.vdot.state.va.us/forms/ .

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: RIPRAP	NUMBER: IIM-LD-73.5
SPECIFIC SUBJECT: STONE DIMENSIONS; SOIL SURVEY; CONSTRUCTION PROCEDURE	DATE: JULY 9, 2008
	SUPERSEDES: IIM-LD-73.4
DIVISION ADMINISTRATOR APPROVAL: Mohammad Mirshahi, P.E. State Location and Design Engineer Approved July 9, 2008	

Changes are shaded.

CURRENT REVISION

- This memorandum was revised to add Pay Items for Erosion Control Stone Class AI, Standard EC-1 (Tons and Square Yards).

EFFECTIVE DATE

- This memorandum is effective upon receipt.

POLICY

- The Road and Bridge Specifications allow Riprap that is primarily placed by the dumped method to be measured by Square Yards or Tons.
- Unless otherwise requested by the District Administrator at Field Inspection Stage, the measurement should be in Tons to comply with the supplier's method of measurement and expedite final measurement for payment by field personnel.

DIMENSIONS AND WEIGHTS

- The following table may be used as a guide for state personnel to correspond certain rock dimensions to equivalent weights. This table is not to be used for acceptance or rejection of Riprap material

APPROXIMATE ROCK DIMENSIONS AND EQUIVALENT WEIGHTS			
WEIGHT	MEAN SPHERICAL DIAMETER	RECTANGULAR SHAPE	
		LENGTH	HT./WIDTH
25 lbs.	0.7’	1.1’	0.4’
50 lbs.	0.8’	1.4’	0.5’
75 lbs.	1.0’	1.6’	0.5’
100 lbs.	1.1’	1.75’	0.6’
150 lbs.	1.3’	2.0’	0.67’
300 lbs.	1.6’	2.6’	0.9’
500 lbs.	1.9’	3.0’	1.0’
1000 lbs.	2.2’	3.7’	1.25’
1500 lbs	2.6’	4.7’	1.5’
2000 lbs.	2.75’	5.4’	1.8’
2 tons	3.6’	6.0’	2.0’
3 tons	4.0’	6.9’	2.3’
4 tons	4.5’	7.6’	2.5’
10 tons	6.1’	10.0’	3.3’

APPROXIMATE PERCENT OF VOIDS	
%	MATERIAL
25	DRY RIPRAP CL.AI
25	DRY RIPRAP CL.I
25	DRY RIPRAP CL.II
25	DRY RIPRAP CL.III
25	DUMPED RIPRAP TY.I
25	DUMPED RIPRAP TY.II
25	EROSION CONTROL STONE
25	GROUTED RIPRAP
25	STONE RIPRAP (CLASSIFICATION SHOWN ON PLANS)

PROCEDURES

- A soil survey is to be conducted through areas where a channel change is proposed and through embankment areas where riprap may be required. The plans or profile rolls for the regular soil survey will show the location of channel changes and the location where riprap will be required on the fill section.

- Borings along the proposed channel change are to be taken at sufficient intervals to determine the type of material encountered along the slopes and in the bottom of the channel.

- The borings made in the cut sections or in the borrow pits for construction of the fills are adequate to determine the type of material used in the fills. The test results on the material used in embankments or along channel changes where riprap is required should include the Plastic and Liquid Limits of the minus No. 40 sieve and the grading or particle size of the total sample. This information should be submitted in the regular Soil Survey Report.

- The Project Inspector will visually examine the slope upon which the plans designate Riprap to be placed. If the slope material appears coarser than the bedding aggregate specified, the Project Inspector is to notify the District Materials Engineer, through normal channels, for a more detailed investigation to determine the actual need for the bedding. If the slope is comprised of solid rock or closely consolidated boulders with soundness, size and weight equal to or exceeding the specifications, for the proposed riprap, then the riprap may be deleted by the District Construction Engineer.

PLANS

- The project designer shall specify on the plans the type of riprap and the dimensions (length, width and depth) for placement. The quantity shall be computed using two (2) tons per cubic yard (148 lbs. per cu. ft.) for plan estimating purposes, unless otherwise specified by the District Administrator.

- The quantities will be field adjusted, utilizing the supplier’s stone weight and the applicable Percent (%) of Voids for the Type / Class of material used, to obtain the actual quantity.

GENERAL NOTE

- The applicable note is to be included in the project's General Notes when riprap is specified. (See IIM-LD-110, Drainage Notes D-10 & D-11)

D-10 The proposed riprap may be omitted by the Engineer if the slope designated for placement of riprap is found to be comprised of solid rock or closely consolidated boulders with soundness, size and weight equal to, or exceeding, the specifications for the proposed riprap.

The following note is to be included when a Granular Filter Blanket is used in lieu of Geotextile Fabric Bedding. This does not apply to the aggregate cushion which is placed over the geotextile fabric in certain cases.

D-11 The proposed granular filter blanket for the proposed riprap may be omitted by the Engineer if the slope on which it is to be placed is found to be comprised of material which is coarser than that specified for the proposed granular filter blanket.

PAY ITEMS

- The Road and Bridge Specifications allow Erosion Control Stone to be measured by the Square Yard or Ton and to include Bedding for Riprap and Riprap Filter Cloth in the price bid for Riprap.

ITEM CODE	DESCRIPTION	UNIT
09148	Erosion Control Stone Class A1, Standard EC-1	Ton
09149	Erosion Control Stone Class A1, Standard EC-1	Square Yards
09150	Erosion Control Stone Class I, Standard EC-1	Ton
09151	Erosion Control Stone Class I, Standard EC-1	Square Yards
09152	Erosion Control Stone Class II, Standard EC-1	Ton
09153	Erosion Control Stone Class II, Standard EC-1	Square Yards

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: GENERAL NOTES	NUMBER: IIM-LD-110.21
SPECIFIC SUBJECT:	DATE: SEPTEMBER 7, 2010
	SUPERSEDES: IIM-LD-110.20
DIVISION ADMINISTRATOR APPROVAL:	Mohammad Mirshahi, P.E. Location and Design Engineer Approved September 7, 2010

Changes are shaded.

CURRENT REVISION

- Incidental Note I-20 has been revised.

EFFECTIVE DATE

- These instructions are effective upon receipt for all projects except where otherwise noted below.

GENERAL INSTRUCTIONS

- It is unlikely that any one project will need all of the available general notes. Designers should use only those notes that are applicable. It may be necessary to modify notes and/or supplement notes with additional information.
- Notes referring to dated materials, such as Specifications or Standards, should be updated when new or revised Specifications or Standards take effect, as applicable.
- The General Notes are available as CADD cells.

- The Drainage, Erosion and Sediment Control and Stormwater Management General Notes to be used with each project will be determined by the Hydraulics Engineer/ESC Plan Designer. The Hydraulics Engineer/ESC Plan Designer will also be responsible for completing any of these notes where project specific information is required.

- Dual Units (Metric and Imperial) are shown for informational purposes.

GRADING GENERAL NOTES

G-1 The grade line denotes top of finished pavement unless shown otherwise on typical sections or plans.

The following applicable notes are for use where settlement is uncertain. (Omit notes G-2 and G-3 if project has both Excavation and Embankment set up as pay items.)

- Applicable when the contract is on plan quantity basis:

G-2 Earthwork quantities on this project are based on anticipated settlement and may require adjusting during construction.

- Applicable when the contract is not on plan quantity basis:

G-3 Earthwork quantities on this project are based on anticipated settlement and may require adjusting during construction. Payment will be made only for quantities actually moved.

Non-significant masonry items (e.g. sidewalk, curb and gutter, paved ditch, small footings, small block or brick items, etc.) may be included in regular excavation and designated by the following note:

G-4 The cost of removal of all existing concrete items located in the area to be graded, including, but not limited to the following, shall be included in the price bid for regular excavation: _____

When a project has excavation of unsuitable material shown on the plans for a specified depth and undercut excavation is not set up as a bid item, the following note will be used:

G-5 The excavation of unsuitable material as specified on these plans is based on previously conducted subsurface soil investigation. If, during construction, it is deemed necessary to change the depth more than 1 foot (0.3 m) or the limits of such excavation, such change shall be made at the direction of the Engineer and measurement and payment shall be made in accordance with Section 303 of the applicable VDOT Road and Bridge Specifications.

G-6 The borrow material for this project shall be a minimum CBR_____or as approved by the Materials Engineer.

G-7 Material from regular excavation which is suitable for stabilization with hydraulic cement (lime) shall be placed in the top portion of the subgrade.

DRAINAGE GENERAL NOTES

D-1 The horizontal location of all drainage structures shown on these plans is approximate only, with the exception of structures showing specific stations, special design bridges and storm sewer systems.

D-2 The horizontal location and invert elevations shown for proposed culverts and storm sewer outfall pipes are based on existing survey data and required design criteria. If, during construction, it is found that the horizontal location or invert elevations shown on the plans differ significantly from the horizontal location or elevations of the stream or swale in which the culvert or storm sewer outfall pipe is to be placed, the Engineer shall confer with, and get approval from, the applicable District Drainage Engineer before installing the culvert or storm sewer outfall pipe.

D-3 The “H” dimensions shown on the plans for drop inlets and junction boxes and the “L.F. (m)” dimensions shown for manholes are for estimating purposes and are based on the proposed invert elevations shown for the structure and the anticipated top (rim) elevation based on existing or proposed finished grade. The actual “H” or “L.F. (m)” dimensions are to be determined by the contractor from field conditions.

The following note is to apply only at specific locations that are designated on the District Administrator’s Field Inspection Report. The portion regarding “Excavation For Minor Structures” will apply to single line culvert installations with a diameter or span of 48” (1200 mm) or greater or any multiple line culvert installation with an overall span (out to out) of 48” (1200 mm) or greater.

D-4 At Station _(specify station number)_ , the fill shall be placed and allowed to settle and displace all soft materials. Any necessary temporary drainage shall be installed. When directed by the Engineer, that part of the fill where the permanent drainage structure is to reside shall be removed and the structure placed. The cost of installing and removing the temporary drainage facility, the cost of removing the fill above the original ground for installation of permanent drainage structure and the cost of backfill shall be included in the unit price bid for regular excavation. Excavation below the original ground necessary for the installation of the permanent drainage structure will be measured and paid for in accordance with Section 303 of the applicable VDOT Road and Bridge Specifications.

If the cost of constructing fills is to be paid for as “embankment” make the appropriate change in the previous note.

The following note is to be included for all projects that have locations that require, or allow as an option, Structural Plate Steel Pipe or Pipe Arch with a concrete invert:

D-5 At locations where Structural Plate Steel Pipe or Pipe Arch with a concrete invert is required or is allowable as an option to Corrugated Steel Pipe or Pipe Arch, the concrete invert is to be field applied and shall cover, at a minimum, the bottom 25% of the circumference of a circular shape structure or the bottom and corner plates of an arch shape structure. As an option to providing the concrete invert, the plates along the bottom 25% (minimum) of the circumference of the Structural Plate Steel Pipe or the bottom and corner plates (minimum) of the Structural Plate Steel Pipe Arch shall be a minimum of two sheet thickness (gages) heavier than the sheet thickness (gage) indicated in the applicable VDOT Road and Bridge Standard PC-1 for the specified height of cover for the structure. Example: For a pipe with height of cover requiring 0.109" (2.8 mm) sheet thickness (12 gage) plates, the bottom plates shall be 0.168" (3.5 mm) sheet thickness (8 gage). The sheet thickness (gage) of the remainder of the pipe plates shall either conform to those specified in Standard PC-1 for the applicable height of cover or to the heavier plates used in the bottom of the pipe.

The following note is to be included when multiple types of pipes are allowed (Allowable Pipe Type Table is required):

D-6 Pipes shall conform to any of the allowable types shown on sheet number (specify sheet number), within the applicable height of cover limitations. For strength, sheet thickness, or class designation, available sizes, height of cover limitations and other restrictions for a particular pipe type or height of cover, see the VDOT Road and Bridge Standard PC-1. Structural plate pipe may be substituted for corrugated pipe of the same size and a structural plate pipe arch may be substituted for a corrugated pipe arch of the same size, provided the substitution complies with the applicable sections of the VDOT Road and Bridge Standard PC-1.

The following note is to be included when only one type of pipe is allowed (Allowable Pipe Type Table is not required):

D-7 All pipe on this project shall be (specify type). For strength, sheet thickness, or class designation, available sizes, height of cover limitations and other restrictions for a particular pipe type or height of cover, see the applicable sections of the VDOT Road and Bridge Standards PC-1.

The following note should be included when the plans specify concrete pipe be be laid on a radius:

D-8 Where open joint pipe is to be used, no joint shall be opened a distance exceeding 25% of the spigot length. Sealing of the pipe joint shall be in accordance with Section 302 of the applicable VDOT Road and Bridge Specifications.

The following note should be included when the plans specify concrete pipe be be laid on a radius and specify a particular pipe joint length:

D-9 A pipe joint length different from that stated on the plans may be used. An adjustment in the percentage of open joint (not to exceed 25% of the spigot length) or amount of bevel shall be made that will obtain the radius stated on the plans. Extra payment for this adjustment will not be allowed. The proposed adjustment shall be approved by the Engineer prior to installation of the pipe line.

The following note is to be included when riprap is specified:

D-10 The proposed riprap may be omitted by the Engineer if the slope designated for placement of riprap is found to be comprised of solid rock or closely consolidated boulders with soundness, size and weight equal to, or exceeding, the specifications for the proposed riprap.

The following note is to be included when a granular filter blanket is used in lieu of geotextile fabric bedding. This does not apply to the aggregate cushion which is placed over the geotextile fabric in certain cases.

D-11 The proposed granular filter blanket for the proposed riprap may be omitted by the Engineer if the slope on which it is to be placed is found to be comprised of material which is coarser than that specified for the proposed granular filter blanket.

D-12 All existing drainage facilities labeled “To Be Abandoned” shall be left in place, backfilled and plugged in accordance with the VDOT Road and Bridge Standard PP-1. Basis of Payment will be C.Y. (m^3) of Flowable Backfill.

D-13 Existing drainage facilities being utilized as a part of the drainage system, and designated on the plans “To Be Cleaned Out”, shall be cleaned as directed by the Engineer. The cost incidental to this shall be included in the contract price for other items.

D-14 Proposed drop inlets with a height (H) less than the standard minimum shown in the VDOT Road and Bridge Standards shall be considered and paid for as Standard Drop Inlets for the type specified.

D-15 Where the plans specify the installation of standard curb drop inlets adjacent to the City of _(specify city)_ Standard Curb and Gutter, the Standard Drop Inlets (as shown in the VDOT Road and Bridge Standards) shall be modified in accordance with details shown on sheet number (specify sheet number). These drop inlets shall be considered and paid for as Standard Drop Inlets for the type specified.

D-16 When Standard CG-6 or CG-7 is specified on a radius (such as at a street intersection), the Engineer may approve a decrease in the cross slope of the gutter to facilitate proper drainage.

D-17 St’d SL-1 Safety slab locations are based on the assumed use of precast structures. If cast-in-place structures are utilized, and the interior chamber dimensions (length and width, or diameter) are less than 4 feet, the safety slabs shall not be installed.

PAVEMENT GENERAL NOTES

- The following note applies to projects without bridge approach slabs.

P-1 If any settlement occurs in concrete pavement adjacent to bridges prior to acceptance of the project by the Department, the contractor shall restore the pavement to the original grade either by the mud jack method or by replacing the pavement. In the event the pavement cracks or becomes damaged, it shall be replaced, if directed by the Engineer.

P-2 The pavement materials on this project will be paid for on a tonnage basis. The weight will vary in accordance with the specific gravity of the aggregates and the asphaltic content of the mix actually used to secure the design depth. The weight of the asphalt concrete is based on 95% of theoretical maximum density. (See IIM-LD-158)

INCIDENTAL GENERAL NOTES

On Primary and Secondary projects involving grade crossings to remain in place, show the following notes in the General Notes, on applicable plan sheets and in the summary. Do not include the railroad crossbuck signs in the estimate.

I-1 Two Reflectorized Railroad Grade Crossing Crossbuck Signs, complete with posts, SHALL BE FURNISHED AND ERECTED BY THE RAILROAD COMPANY.

I-2 Two Reflectorized Railroad Advance Warning Signs W10-1 complete with two approved posts, WILL BE FURNISHED AND ERECTED BY STATE FORCES.

The following note applies to all projects where access to private property will ultimately be by means of a service road. This note will be on the plans for all applicable projects when submitted for Right of Way Acquisition:

I-3 Service Roads are to be constructed, and private entrances connected thereto prior to the permanent severing of private entrances by other phases of the proposed construction.

- Principal-Minor Arterial Projects:

I-4 All trees located within the Clear Zone or within a minimum of 30 feet (9m) of the edge of pavement, within the limits of the right of way or construction easement, unless otherwise noted on plans or directed by the Engineer, shall be removed, as provided for in Section 301 of the applicable VDOT Road and Bridge Specifications.

- Secondary – Collector – Local Projects:

I-5 That portion of the right of way lying within the Clear Zone or within a minimum of 10 feet (3m), from the edge of pavement or surfacing or within the limits of the construction slopes beyond 10 feet (3m), shall be cleared and grubbed in accordance with the applicable VDOT Road and Bridge Specifications, Section 301, where sufficient right of way or construction easement is provided.

Exceptions:

I-6 Certain trees shall be preserved as noted on plans or as directed by the Engineer.

I-7 Where Standard slope roundoffs would damage trees, bushes or other desirable vegetation, they shall be omitted when so ordered by the Engineer.

The following note shall be shown on all applicable plans when submitted for right of way acquisition:

I-8 All fruit trees between Station _____ and Station _____, lying within the right of way, shall be removed and destroyed. These trees shall be removed and destroyed as soon as possible after the contractor actually commences work. The cost of this work shall be included in the price bid for clearing and grubbing.

When the following note applies to specific locations on a project, show Sta. _____ to Sta. _____.

I-8A Clearing and grubbing shall be confined to those areas needed for construction. No trees or shrubs in ungraded areas shall be cut without the permission of the Engineer. Station_____ to Station _____.

I-9 When no centerline alignment is shown for a proposed entrance, the entrance shall be constructed in the same location as the existing entrance.

Right of Way Monuments (RM-1 and RM-2) will be set in accordance with Road and Bridge Specification 105.13 except when note I-10 and/or I-12 is shown on applicable projects:

I-10 St'd. RM-1 Right of Way Monuments shall be set by the Contractor.

I-11 VOID

I-12 St'd. RM-2 Right of Way Monuments shall be set by the Contractor.

The following notes will be included in the General Notes when "Reuse Guardrail" is specified in the plans as follows:

a) Used when the District Administrator desires to retain the guardrail component materials not used by the Contractor in the new construction:

I-13 Salvaged guardrail materials not used in the new construction shall become the property of the Department and the Contractor shall deliver and store, at no additional cost to the Department, the unused materials at the Department's maintenance yard at (location) during the Department's normal working hours.

b) Used when the District Administrator does not wish to retain the guardrail component parts not used by the Contractor in the new construction:

I-14 Salvaged guardrail materials not used in the new construction shall become the property of the Contractor and shall be disposed of at a licensed landfill, recycled or be retained by the contractor.

The following note may be used with note I-13 or I-14:

I-15 Where Guardrail Standard GR-2 or GR-8 is shown on the plans and in the summaries, either new guardrail or reused guardrail beam shall be used as provided elsewhere in these plans. The total quantities have been proportioned between new and reuse guardrail based on an estimate of the amount of existing beam that is reusable. The Contractor will be paid for the actual quantities of Guardrail, St'd GR-2 or St'd. GR-8, or Reuse Guardrail St'd. GR-2 or St'd GR-8, as determined by the Engineer.

The following note will be included in the General Notes when the Underground Utilities" survey data on a project has been provided by a consultant. (See IIM-LD-140)

I-16 The "Underground Utilities" survey data on this project has been provided by consultant and copies are available from the Department.

The following note is applicable in accordance with VDOT's Road Design Manual:

I-17 For method of constructing Straight-Line Taper Lanes in Curb and/or Curb and gutter sections, see typical details on Sheet _____.

I-18 All pavement markings and traffic flow arrows shown on the roadway construction plans are schematic only. The actual location and application of pavement markings shall be in accordance with Section 704 of the applicable VDOT Road and Bridge Specifications, MUTCD, sequence of construction/traffic control plans, pavement marking plan sheets _____ thru _____ and as directed by the Engineer.

The following note is applicable to projects having work performed by others:

I-19 The following outside sources, under contract with VDOT, have provided information on this project.

Hydraulic Design	(Show Name of Source)
Roadway Design	" " " "
Utility Design	" " " "
Utility Designation	" " " "
Utility Location	" " " "
Survey	" " " "
Bridge Design	" " " "

If questions or problems arise during construction, please contact the Project Designer. DO NOT CONTACT THE OUTSIDE SOURCES.

The following notes are applicable to all projects:

I-20 The Official Electronic PDF Version of the plans will override the paper copies or prints of specific layers. Portions of this plan assembly have been CADD generated. To assist in the preparation of the bid and construction of the project, Microstation format (.dgn) files will be made available to the prime contractor during bids and after award of the contract.

I-21 All electronic plan assemblies will include the construction plans in two formats: PDF files and Microstation format (.dgn) files. Only the PDF files will be considered as part of the official plan assembly.

The Microstation format (.dgn) files are furnished only as information for the contractor. These plans are developed in layers (levels) to aid in readability. However, the construction items may or may not be in the proper layering scheme as described in the VDOT CADD Manual. The Microstation files will only match the scanned files if all required levels are turned on. A Microstation Software license is required to be able to read these files.

STORMWATER MANAGEMENT (SWM) GENERAL NOTES

S-1 CLEARING AND GRUBBING OF SWM BASIN SITE – The area where the dam is to be constructed and the area upstream of the dam, to an elevation equal to the crest of the dam (maximum ponded water elevation), shall be cleared and grubbed in accordance with Section 301 of the applicable VDOT Road and Bridge Specifications.

S-2 SWM BASIN DAM CONSTRUCTION – The dam for detention basins (no permanent pool) shall conform to the details contained in the plans and shall be constructed in accordance with Section 303 of the applicable VDOT Road and Bridge Specifications. The native material on which the dam will set shall meet the specifications for AASHTO Type A-4 or finer material. Where the native material does not meet this requirement, the area beneath the dam is to be excavated a minimum of 4’ (1.2 m) and backfilled with a material meeting the AASHTO Type A-4 or finer classification, unless otherwise specified in the plans. The material used for the embankment of the dam shall be AASHTO Type A-4 or finer or as otherwise specified in the plans. Dams with foundation and embankment material not meeting the above requirements, dams greater than 15’ (4.6 m) in height, or dams for retention basins (permanent pool) shall incorporate a membrane-lined trench, a homogenous embankment with seepage controls, a zoned embankment or other such approved designs as specified in the plans.

S-3 SWM BASIN OUTLET PIPE – The pipe culvert under or through the dam for detention basins (no permanent pool) shall be reinforced concrete pipe with rubber gaskets in accordance with Section 232 and 212 of the applicable VDOT Road and Bridge Specifications. A concrete cradle shall extend the full length of the pipe culvert in accordance with the Standard Drawings. The connection between the pipe culvert and the SWM-1 Drainage Structure (or other control structure) shall be made watertight as approved by the Engineer and the cost shall be included in the price bid for the pipe.

S-4 The SWM-1 Drainage Structure (or other control structure) shall have 4" (100 mm) high numbers and 1" (25 mm) wide stripes painted at 1' (300 mm) intervals as shown on the Standard Drawings or detail sheets. The numbers and stripes are to be installed at the time of the initial installation of the SWM-1 Drainage Structure (or other control structure). Paint and application shall be in accordance with Section 231 and 411 of the applicable VDOT Road and Bridge Specifications and the cost is to be included in the price bid for the applicable structure.

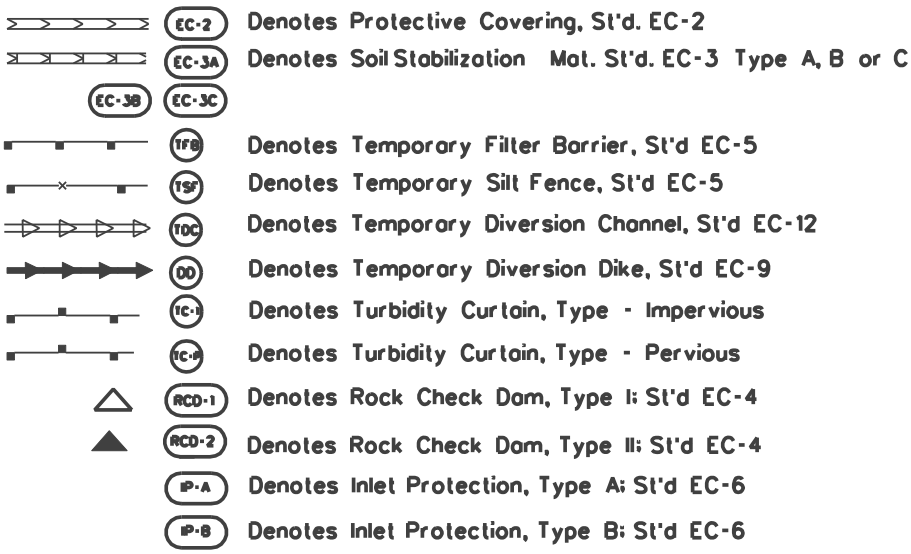
S-5 All SWM Basins designated for use as temporary sediment basins shall be constructed during the initial phase of earth moving activities or as specified by the plans or directed by the Engineer. During project construction, the SWM-1 Drainage Structure (or other control structure) shall be modified in accordance with the Standard Drawings or plan details in order to provide a temporary sediment basin with both a "wet" storage volume (permanent pool) and a "dry" storage volume. Sediment accumulated in the basin shall be removed when the volume of the "wet" storage (permanent pool) has been reduced by 50%. Sediment shall be disposed of in accordance with Section 106.04 of the applicable VDOT Road and Bridge Specifications. When project construction is complete to a stage where no additional sediment from the project is expected to enter the basin, as determined by the Engineer, the basin shall be cleaned out and restored to the original design elevations, the area stabilized and all temporary modifications to the SWM-1 Drainage Structure (or other control structure) removed.

EROSION AND SEDIMENT CONTROL (ESC) GENERAL NOTES

E-1 If the removal of Brush Silt Barrier is specified by the plans or required by the Engineer, the cost of removal and disposal of brush shall be in accordance with Section 109 of the applicable VDOT Road and Bridge Specifications.

E-2 Rock for Check Dams, Inlet Protection, Erosion Control Stone and Riprap shall be in accordance with Section 203 and Section 414 of the applicable VDOT Road and Bridge Specifications.

E-3 The following symbols are used to depict Erosion and Sediment Control items in the plan assembly:



The ESC symbols are to be used to denote proposed erosion and sediment control items on the plans and are available in the CADD Cell and Custom Line Style Libraries and the GeoPak Road Plan View Labels.

The location (sheet number) of the ESC legend is to be noted in the “References” block on each applicable sheet of the plan set.

ELECTRONIC SELECTION OF GENERAL NOTES

Microstation has the capability of incorporating the necessary inserts in the General Notes (e.g. sheet number, station, etc.) and also incorporating any additional notes that are required for the project. The General Notes are to be shown for the applicable unit of measurement (Imperial or Metric). General Notes with metric units are denoted by the suffix “M”.

- A General Notes Sheet file is created as follows:

  - Create a file in MicroStation by using the **SEEDGEN.DGN** seed file.

  - Ensure that the **LGENNOTE.CEL** is part of the workspace search list for MicroStation cell library. (If you are using the **LD** workspace, then this is already set.)

Type **macro gnote** into the “Key-in Windows”. This will start a MicroStation macro command that will prompt you for information about the General Notes Sheet.

- Select the notes needed, or select the **Select All** button, then de-select the notes that are not needed. The **Add Sp** button will prompt you for additional spaces that you may need between each note header.

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: ROADSIDE DEVELOPMENT	NUMBER: IIM-LD-122.13
SPECIFIC SUBJECT: ROADSIDE DEVELOPMENT SHEET; COORDINATION; COMPUTING QUANTITIES/SUMMARIZATION	DATE: APRIL 27, 2009
	SUPERSEDES: IIM-LD-122.12
DIVISION ADMINISTRATOR APPROVAL:	Mohammad Mirshahi, P.E. State Location and Design Engineer Approved April 27, 2009

Changes are shaded.

CURRENT REVISION

- The typical fertilizer application rate has been revised in accordance with the 2007 Road and Bridge Specifications. An application rate of 300 pounds per acre is to be estimated unless otherwise specified by the Maintenance Division.

EFFECTIVE DATE

- These instructions are effective upon receipt.

POLICY

- The Roadside Development Sheet and the Erosion Control Summary Sheet are to be included in project plan assemblies.
- The Roadside Development Summary will indicate the Maintenance Division's recommended seed mixtures, and estimated quantities for Topsoil, Seeding (Regular and Legume), Fertilizer and Lime.
- Seed additives (e.g. foxtail millet) are paid for as Regular Seeding except Crown Vetch, Sericea Lespedeza and Birdsfoot Trefoil
- Seed mixture recommendations may at times deviate from the seed mixture guidelines on the Roadside Development Sheet. The District Roadside Manager will provide recommendations for the application of seed mixtures (core mix and additives), fertilizer, lime, etc.

SPECIAL INSTRUCTIONS

- The approximate area (hectares or acres) to be disturbed will be shown under “Notes” on the Roadside Development Sheet. This area is not to be expanded for estimating purposes.

- Notes on the Roadside Development Sheet marked by a star are for the use of field forces only. The Designer is not to use any percentages shown under “Notes” on the Roadside Development sheet when computing quantities.

MULCH

- Roadside Development involves two categories of mulch as follows:

  - Seeding Mulch, Type I or II is applied in the field with the seed mixture. This mulch is included in the price for the regular seeding and is not summarized in the plans.

  - Erosion Control Mulch is summarized on the Erosion Control Summary Sheet when recommended by the Maintenance Division. This material is estimated at the rate of 0.25 acres (1,210 S.Y.) per 100 feet of alignment or 0.332 hectares (3,319 m2) per 100 meters of roadway alignment) and is to be paid for as follows:

PAY ITEM	UNIT	ITEM CODE
Erosion Control Mulch	Acres (Hectare)	27288
Erosion Control Mulch	S.Y. (m2)	27284

LEGUME SEEDING

- The seed mixes available for roadside development include three “Legume” seeds, Crown Vetch, Sericea Lespedeza and Birdsfoot Trefoil specified as additives “E, F. and G” on the Roadside Development Sheet.

- These Legume seeds are used only on slopes 3:1 or greater and are not used on shoulders or other locations to be mowed.

- Legume Seed, and Legume Overseeding are to be summarized for separate payment.

- Whenever the Maintenance Division specifies any of these Legume seeds, the mowable areas on the project (slopes flatter than 3:1) and non-mowable areas (slopes 3:1 and greater) must be measured separately in order to accurately summarize the seeding requirements.

ESTIMATING QUANTITIES

- If the lime application rate is not provided by the Maintenance Division, the Designer should estimate the Normal Lime Quantity based on 2 tons per acre (5 metric tons per hectare).

- If the fertilizer application rate is not provided by the Maintenance Division, the Designer should estimate the Normal Fertilizer Quantity based on 300 pounds per acre (336 kilograms per hectare).

- The seed mixtures (core mix plus additives) shown on the Roadside Development Sheet are weights per acre (or hectare) of disturbed area. These quantities may vary for each construction season.

- The Designer is advised to:

  1. Determine the disturbed area to be seeded.

  2. Determine the application rate for the sloped and mowed areas shown for each construction season.

     Example for Seed Mix 2E:
     100 lbs. Core Mix + 20 lbs. Additive =120 lbs.

  3. The greatest seeding rate is assumed to be the “Normal” Seeding rate.

     Example for 10 acre area:

MIX REQUIREMENTS ON THIS PROJECT

PROJECT NUMBERS	SLOPES	MOWED	SLOPES	MOWED	SLOPES	MOWED
	SPRING & FALL		SUMMER		LATE FALL & WINTER	
0123-123-103	2E	2B	3A	3A	4B	4B
	120 LBS.	120 LBS.	110 LBS	110 LBS.	120 LBS.	120 LBS.

The Normal Seeding rate = 120 lbs. per acre.
120 lbs. x 10 acres of disturbed area = 1200 lbs. “Normal” Seeding Quantity

- When a legume seed additive is specified (Crown Vetch, Sericea Lespedeza or Birdsfoot Trefoil) the sloped areas and mowed areas must be measured separately when summarizing seeding quantities.

  1. Determine the flat (less than 3:1) areas and sloped (3:1 and greater) areas to be seeded.

     Example: 10 acres of mowed areas; 5 acres of sloped areas.

  2. Determine the application rate for the mowed areas.

Example for “Seed Mix 2B”:100 lbs. Core Mix + 20 lbs. Additive = 120 lbs.

3. Determine the application rate for the sloped areas:

   Example for Seed Mix 2E: Core Mix “2” = 100 lbs.; Additive E” = 20 lbs.

4. Determine the quantities of Regular Seed and Legume Seed.

   Example for mowed area (Seed Mix 2B):
   Core Mix 100 lbs. + 20 lbs. = 120 lbs. x 10 acres = 1200 lbs. Regular Seed

   Example for sloped areas (Seed Mix 2E):
   100 lbs. x 5 acres = 500 lbs. Regular Seed
   20 lbs. x 5 acres = 100 lbs. Legume Seed

- The “Normal” quantities for lime, fertilizer, and seeding are based on the actual area to be disturbed. The “Normal” quantities are to be increased by the following percentage factors to obtain the quantity to show in the summary:

  - Lime = Normal Quantity increased by 90%
  - Fertilizer (15-30-15)= Normal Quantity increased by 90%
  - Regular Seed = Normal Seeding Quantity increased by 60%
  - Overseeding=100% of Normal Seeding Quantity (no mulch or fertilizer)
  - Legume Seed = Normal Seeding Quantity increased by 60%
  - Legume Overseeding = 100% of Normal Seeding Quantity (no mulch or fertilizer)

  Examples for determining quantities to summarize:

  20 tons “normal” Lime x 1.90 (or 190%) = 38 tons Lime
  3 tons “normal” Fertilizer x 1.90 (or 190%) = 5.7 or 6 tons Fertilizer
  1700 lbs.“normal”Seeding x 1.60 (or 160%) = 2720 lbs. Regular Seeding
  1700 lbs. “normal” Seeding (@ 100%) = 1700 lbs. Overseeding
  100 lbs. “normal” Legume Seeding x 1.60 (or 160%)= 160 lbs. Legume Seed
  100 lbs. “normal” Legume Seeding (@ 100%) = 100 lbs. Legume Overseeding

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PAY ITEMS

• Lime	Metric Ton/Ton	27250
• Fertilizer	Metric Ton/Ton	27215
• Regular Seed	kg/lbs.	27102
• Overseeding	kg/lbs.	27103
• Legume Seed	kg/lbs.	27104
• Legume Overseeding	kg/lbs.	27105
• Topsoil Class A	ha/acres	27012
• Topsoil Class B	ha/acres	27022
• Erosion Control Mulch	ha/acres/m2/S.Y.	27288

REVIEW BY MAINTENANCE DIVISION

- The Roadside Development Sheet is to be reviewed by the Maintenance Division prior to submission of the plan assembly for construction.

- Anytime the current Roadside Development Sheet is replaced by a revised Roadside Development Sheet, the District Roadside Manager should be requested to determine the need for any changes in seed mixes, quantities, etc.

INSERTABLE SHEETS

- The Imperial Roadside Development Sheet may be accessed from the **sheet2000.cel** library in Microstation.

  - A-4 Roadside Development Sheet (RDSDEV)

- The Metric Roadside Development Sheet may be obtained through the insertable sheet directory on Falcon DMS.

  - Special Design Section Drawing No. MA-4 (Metric)

- The Imperial Erosion Control Summary Sheet may be accessed from the **sheet2000.cel** library in Microstation.

  - A-5 Erosion Control Summary Sheet (ECSUM)

- The Metric Erosion Control Summary Sheet may be obtained through the insertable sheet directory on Falcon DMS

  - Special Design Section Drawing No. MA-5 (Metric)

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: SOIL STABILIZATION MAT	NUMBER: IIM-LD-166.4
SPECIFIC SUBJECT: STANDARD EC-3	DATE: DECEMBER 1, 2005
	SUPERSEDES: IIM-LD-166.3
DIVISION ADMINISTRATOR APPROVAL: Mohammad Mirshahi, P.E. State L&D Engineer Approved: December 1, 2005	

Changes are shaded.

CURRENT REVISION

- Updated for current Division Administrator Approval.

EFFECTIVE DATE

- These instructions are effective on all projects scheduled for the August 1996 advertisement and all subsequent projects.

POLICY

Ditches

- Geotextile materials designated as Standard EC-3 (Type A and B) Soil Stabilization Mat are used for protective linings in ditches.
- Standard EC-3 Soil Stabilization Mat is intended to be used as a protective ditch lining material to be applied when the design velocity exceeds the allowable velocity for Standard EC-2 (i.e., jute mesh).

- When the design velocity exceeds the allowable velocity for Standard EC-3, a paved (or riprap) lining will be required.

Slopes

- The Standard EC-3 (Type C) Soil Stabilization Mat may be used as a protective slope lining for dry cut or fill slopes and wet cut slopes to stabilize the slope on which vegetation is being established. (See Road and Bridge Standards)

TYPES AND APPLICATION

Ditches

- Type A is to be employed where the design (2 year) velocity in the ditch is within the range of 1.2 to 2.1 meters per second (m.p.s.) (4 to 7 f.p.s.)

- Type B is to be employed where the design velocity is within the range of 2.1 to 3.0 m.p.s. (7 to 10 f.p.s.)

- A Manning's "n" value of 0.05 should be used with Standard EC-3.

- Typically, the use of Standard EC-3 Type A should begin at the point where flow velocity exceeds 1.2 m.p.s. (4 f.p.s.) (velocity is assumed to be for flow in an EC-2 lined channel) and continue changing to EC-3, Type B at the appropriate point, until the design velocity exceeds 3.0 m.p.s. (10 f.p.s.) or until such point as the use of a ditch lining can be discontinued.

- Experience has shown that the installation of this material is particularly critical. It must be installed in strict accordance with the standard drawings and manufacturer's specifications.

- It is requested that Standard EC-3 (Type A and B) installations be monitored very closely to determine the validity of the present design criteria. It is recommended that the District Drainage Engineer, in cooperation with appropriate District Environmental and/or maintenance personnel, visit these installations, particularly after significant or intense rainfall events, and prepare a report of their observations which would then be submitted to the Central Office Hydraulics Section on a regular basis until further notice.

PAY ITEMS AND SUMMRIZATION

The following items are to be summarized, when applicable, in the Erosion & Sediment Control Summary:

ITEM	UNIT	ITEM CODE
Soil Stabilization Mat EC-3, Type A	m^2 (S.Y.)	27325
Soil Stabilization Mat EC-3, Type B	m^2 (S.Y.)	27326
Soil Stabilization Mat EC-3, Type C	m^2 (S.Y.)	27327

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: POST DEVELOPMENT STORMWATER MANAGEMENT	NUMBER: IIM-LD-195.7
SPECIFIC SUBJECT: MINIMUM REQUIREMENTS FOR THE ENGINEERING, PLAN PREPARATION AND IMPLEMENTATION OF POST DEVELOPMENT STORMWATER MANAGEMENT PLANS	DATE: DRAFT 9/27/10
	SUPERSEDES: IIM-LD-195.6
DIVISION ADMINISTRATOR APPROVAL:	

CURRENT REVISION

- Guidelines for water quality and quantity control have been clarified in accordance with the Virginia Department of Conservation and Recreation's annual plan review of the VDOT Erosion and Sediment Control and Stormwater Management Standards and Specifications and the Virginia Erosion and Sediment Control and Stormwater Management Program Law and Regulations.

- Shading has been omitted from this memorandum.

EFFECTIVE DATE

- Except for the water quality volume requirements in Section 5.4.4.2, the information contained in this IIM is effective upon receipt. The water quality volume requirements in Section 5.4.4.2 shall be implemented in accordance with Section 19.0 of this IIM.

ACRONYMS

- BMP – Best Management Practice
- CBPA – Cheaspeake Bay Preservation Area
- DCR – Department of Conservation and Recreation
- ESC – Erosion and Sediment Control
- FEMA – Federal Emergency Management Agency
- IIM – Instructional and Informational Memorandum
- MS – Minimum Standard
- MS4 – Municipal Separate Storm Sewer System
- PAC – Pre-Advertisement Conference
- R&B – Road and Bridge
- RFP – Request for Proposal
- SWM – Stormwater Management
- SWCB – Soil and Water Conservation Board
- TMDL – Total Maximum Daily Load
- SWPPP – Stormwater Pollution Prevention Plan
- VDOT – Virginia Department of Transportation
- VSMP – Virginia Stormwater Management Program
- WQV – Water Quality Volume

DEFINITIONS

- Adequate Channel – A channel that meets the technical criteria contained in Section 5.2 and 5.3 of this IIM.
- Average Land Cover Condition – A measure (in percent) of the average amount of impervious area within a watershed. For regulatory purposes, this value is assumed to be 16%.
- Channel – A natural or manmade waterway (includes culverts and storm sewer systems).
- Discharge Point – The point at which stormwater and/or a pollutant leaves the site.
- Department – The Virginia Department of Transportation.
- Land Disturbing Activity" or "Land Disturbance" - A manmade change to the land surface that potentially changes its runoff characteristics including any clearing, grading or excavation associated with a land disturbing activity.
- Linear Development Projects – Those land disturbing activities linear in nature such as, but not limited to, highway construction/maintenance projects/activities, construction/maintenance of stormwater channels and stream restoration projects.
- MS4 General Permit - General Permit For Discharges Of Stormwater From Small Municipal Separate Storm Sewer Systems.
- Non-Linear Projects – Those land disturbing activities not considered linear in nature such as, but not limited to, parking lots, rest areas and District/Residency/Area Headquarter complexes.
- Outfall – See Discharge Point.
- Receiving Channel – The off site drainage facility that the proposed land disturbing activity discharges into.

- Regulated Land Disturbance Activities – Those activities that disturb one acre or greater except in those areas designated as a Chesapeake Bay Preservation Area in which case the land disturbance threshold is 2500 square feet or greater (unless the activity is specifically exempted by the VSMP Law and/or Regulations).
- Site – The total area of land on which the project or land disturbing activity is located. For linear projects, this is typically the area of the right of way or permanent easement on which the roadway section exists or is constructed. For non-linear projects, it is typically the total area of the property within which the proposed development is occurring.
- Virginia SWM Handbook – First Edition (1999) Volume I and II.

1.0 PROGRAM BACKGROUND

1.1 Acts of the General Assembly and the SWCB have resulted in the issuance of Virginia Stormwater Management Program Law and Regulations and Virginia Erosion and Sediment Control Law and Regulations. The general application of the VSMP Law and Regulations to VDOT operations is addressed in this IIM. The general application of the ESC Law and Regulations to VDOT operations is addressed in the current version of IIM-LD-11.

Further information regarding the VSMP Law and Regulations or the Virginia ESC Law and Regulations may be obtained from the Virginia Department of Conservation and Recreation at: http://www.dcr.virginia.gov/soil_and_water/

1.2 Additional information may also be obtained from the Virginia SWM Handbook (Volume I and II) (1999) and the Virginia ESC Handbook (1992) published by DCR and available at the web site noted in Section 1.1.

2.0 PROGRAM OBJECTIVE

2.1 Post Development Stormwater Management

To inhibit the deterioration of the aquatic environment by instituting a post development stormwater management program that maintains both water quantity and quality post development run-off characteristics, as nearly as practicable, equal to or better than pre-development run-off characteristics.

2.2 Erosion and Sediment Control

To effectively control soil erosion, sediment deposition, and post development run-off in order to protect downstream properties from erosion and flooding and to minimize on site soil erosion and transportation of sediment off the project site.

3.0 PROGRAM ADMINISTRATION

3.1 VDOT requests an annual approval of its ESC and SWM Standards and Specifications from DCR. By its annual approval of VDOT's ESC and SWM Standards and Specifications, DCR authorizes VDOT to administer its ESC and SWM Program in accordance with the approved ESC and SWM Standards and Specifications on all regulated land disturbance activities undertaken by the Department.

3.2 VDOT's Approved ESC and SWM Standards and Specifications shall apply to all plan design, construction and maintenance activities undertaken by VDOT, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC and VSMP Law and Regulations. During any inspections of VDOT land disturbing activities by DCR, EPA and other such environmental agencies, compliance with the VDOT Approved ESC and SWM Standards and Specifications (and all parts thereof) will be expected.

3.3 Any revisions to the VDOT's approved ESC and SWM Standards and Specifications shall be reviewed and approved by the DCR prior to implementation. Such review and approval shall be coordinated by the VDOT ESC Program Administrator (State Hydraulics Engineer).

4.0 POLICY/GENERAL GUIDELINES

4.1 The VSMP Regulations are applicable to all land disturbing activities where one acre or greater (2,500 square feet or greater in a designated CBPA) of land is disturbed except as noted in Section 4.8 of this IIM.

4.2 The VSMP Regulations are applicable to all State Agency Projects and shall apply to all regulated land disturbing activities, both construction and maintenance, undertaken by the VDOT, either by its internal workforce or contracted to external entities, including those constructed/developed under the Public/Private Transportation Act (PPTA), the Design/Build process and the Capital Outlay Program.

4.3 Projects, such as subdivision streets, industrial access roads, etc., which are designed and constructed by other parties and which are eligible for acceptance into the state roadway system for maintenance after completion of construction are not considered state agency projects and must, typically, conform to appropriate local regulations (see exception in Section 4.5 of this IIM).

4.4 Land disturbing activities occurring within existing VDOT right of way that are a part of an off site development and which are allowed by permit and designed and constructed by other parties, are not considered state agency projects and must, typically, conform to the appropriate local SWM Regulations (see exception in Section 4.5 of this IIM).

4.5 Prior to the issuance of a VDOT Land Use Permit or the acceptance of a roadway facility into the state roadway system, land disturbing activities identified in Section 4.3 and 4.4 of this IIM and which occur in a designated MS4 area or a watershed with an approved TMDL plan shall be reviewed by the appropriate VDOT personnel for compliance with the conditions of the MS4 General Permit and/or the approved TMDL plan and the requirements of the VDOT Implementation Plan for the MS4 General Permit conditions. Those activities found not to comply with the conditions of the MS4 General Permit or an approved TMDL plan or the VDOT MS4 Implementation Plan requirements and responsibilities shall not be issued a Land Use Permit nor be accepted into the state system of roadways until such compliance is demonstrated.

4.6 With regards to changes to the land surface, the impact of any such changes should be based on the proposed post development condition of the site and should consider the effects of a mature vegetative cover and should not be based on the temporary surface changes that occur during construction activities. The temporary surface changes occurring during construction activities are addressed by the Virginia ESC Regulations.

4.7 Milling and/or overlaying/reconstructing an existing impervious surface is not considered a land disturbance activity but any associated shoulder or ditch grading would be considered in the calculation of the total land disturbance quantity for the proposed activity.

4.8 The following land disturbance activities are exempt from the VSMP Regulations:

- Linear development projects (e.g., highway construction projects) where less than one acre will be disturbed per outfall or watershed and where there will be insignificant increases in peak flow rates and where there is no existing or anticipated flooding or erosion problems downstream of the discharge (outfall) point. For projects with multiple outfalls, this exemption shall be applied to each outfall meeting the noted criteria.

- Routine maintenance activities that are performed to maintain the original line and grade, hydraulic capacity or original construction of the project and which disturb less than five acres of land.

4.9 When requested by the DCR prior to the public participation phase of a project (or other such phase where no public participation process is required), VDOT projects located in jurisdictions with more stringent SWM technical criteria than that required by the VSMP Regulations (as identified in this IIM) shall be designed, to the maximum extent practicable, to meet those more stringent criteria. The local criteria may be part of a locally adopted DCR approved SWM program or may be part of a watershed initiative related to the protection of a water supply, a TMDL implementation plan, or a Tributary Strategy plan. It will be the responsibility of the SWM Plan Designer to demonstrate to DCR that the more stringent local requirements are not practicable for the project under consideration. Early coordination should occur between the SWM Plan Designer and the local program authority in order to identify any such potential requirements.

5.0 TECHNICAL CRITERIA

5.1 The VSMP Regulations provide technical criteria to address three specific areas:

- Stream Channel Erosion
- Flooding
- Water Quality

The requirements for each of these areas are addressed in this IIM.

5.2 Stream Channel Erosion

5.2.1 Properties and receiving waterways downstream of any land-disturbing activity shall be protected from erosion and damage due to changes in stormwater flows and hydrologic characteristics, including but not limited to, changes in run-off volume, velocity, frequency, duration, and peak flow rate.

5.2.2 Requirements for stream channel erosion control shall be governed by the Virginia ESC Regulation MS 19 for adequate receiving channel for stormwater discharges.

5.2.3 Receiving channels shall be reviewed for adequacy based upon the following criteria:

1. Natural channels shall be analyzed by the use of a post development peak discharge from 2 year storm to verify that stormwater will not cause erosion of the channel bed and banks.

2. All previously constructed man-made channels shall be analyzed by the use of a post development peak discharge from a 2 year storm to verify that the stormwater will not cause erosion of the channel bed or banks.

5.2.4 When utilizing an existing culvert or storm sewer pipe as the outfall for stormwater run-off from the development site, the receiving channel at the outlet end of the existing culvert or storm sewer pipe shall be analyzed for adequacy in accordance with Section 5.2.3 based on the type of receiving channel (natural or man-made).

5.2.5 If existing natural or previously constructed man-made receiving channels are not adequate, then one of the following measures must be implemented:

1. Improve the receiving channel to a condition where the post development peak run-off rate from a two year storm will not cause erosion to the channel bed or banks or the drainage area within the channel complies with the requirements of Section 5.2.9 of this IIM, or

2. Develop a site design that will not cause the pre-development peak run-off rate from a two year storm to increase when run-off discharges into a natural channel or will not cause the pre-development peak run-off rate from a ten year storm to increase when run-off discharges into a man-made channel, or

3. Provide a combination of channel improvements, stormwater detention or other measures to prevent downstream erosion.

5.2.6 Where determined necessary by the SWM Plan Designer or requested by DCR, water quantity control for the 1 year storm may be required if there are existing or anticipated erosion concerns downstream. Such determination or request shall be made prior to the public participation phase of the project (or other such phase when no public participation process is required). Control of the 1 year storm requires detaining the volume of runoff from the entire drainage area and releasing that volume over a 24 hour period. See the Virginia SWM Handbook pages 1-23 and 5-38 thru 5-41 for additional information.

5.2.7 Pre-development conditions for both off site and on site areas shall be those that exist at the time when the final receiving channel analysis is performed. All land cover shall be assumed to be in good condition regardless of actual conditions existing at the time the analysis is done.

5.2.8 Post development conditions for off site areas shall be determined the same as in Section 5.2.7 of this IIM. Post development conditions for the project site shall be determined based on the proposed ultimate development for the site.

5.2.9 One Percent (1%) Rule - If it can be demonstrated that the total drainage area to the point of analysis within the receiving channel is 100 times greater than the contributing drainage area from within the project site, the receiving channel may be considered adequate, with respect to the stability (erosion) requirements, without further analysis.

5.3 Flooding

5.3.1 Properties and receiving waterways downstream of any land disturbing activity shall be protected from localized flooding due to changes in stormwater flows and hydrologic characteristics including, but not limited to, changes in run-off volume, velocity, frequency, duration, and peak flow rate.

5.3.2 For non-linear projects, the 10 year post development peak rate of run-off from the site shall not exceed the 10 year pre-developed peak rate of run-off.

5.3.3 For linear projects, requirements for downstream flooding control shall be governed by the Virginia ESC Regulation MS 19 for adequate receiving channel for stormwater discharges.

5.3.3.1 Receiving channels shall be reviewed for adequacy based upon the following criteria:

1. Natural channels shall be analyzed by the use of a post development peak discharge rate from 2 year storm to verify that stormwater will not overtop the channel banks.

2. All previously constructed man-made channels shall be analyzed by the use of a post development peak discharge rate from a 10 year storm to verify that the stormwater will not overtop the channel banks.

3. Existing culvert and storm sewer systems utilized as stormwater outfalls for the development site shall be analyzed by the use of a post development peak discharge rate from a 10 year frequency storm to verify that the stormwater will be contained within the pipe or storm sewer system.

5.3.3.2 When utilizing an existing culvert or storm sewer pipe as the outfall for stormwater run-off from the development site, the receiving channel at the outlet end of the existing culvert or storm sewer pipe shall be analyzed for adequacy in accordance with Section 5.3.3.1 based on the type of receiving channel (natural or man-made).

5.3.3.3 If existing natural or previously constructed man-made receiving channels or existing culvert or storm sewer pipe systems are not adequate, then one of the following measures must be implemented:

1. Improve the channel to a condition where the post development peak run-off rate from a ten year storm will not overtop the channel banks or the drainage area within the channel complies with the requirements of Section 5.3.3.4 of this IIM, or

2. Improve the culvert or storm sewer system to a condition where the post development peak run-off rate from a ten year storm is contained within the appurtenances, or

3. Develop a site design that will not cause the pre-development peak run-off rate from a two year storm to increase when runoff from the site discharges into a natural channel or will not cause the pre-development peak run-off rate from a ten year storm to increase when run-off from the site discharges into a man-made channel or a culvert/storm sewer system, or

4. Provide a combination of channel/culvert/storm sewer system improvements, stormwater detention or other measures in order to prevent downstream flooding.

5.3.3.4 One Percent (1%) Rule - If it can be demonstrated that the total drainage area to the point of analysis within the receiving channel is 100 times greater than the contributing drainage area from within the project site, the receiving channel may be considered adequate, with respect to the flooding requirements, without further analysis.

5.3.3.5 Pre-development conditions for both the off site and on site areas shall be those that exist at the time when the final receiving channel analysis is performed. All land cover shall be assumed to be in good condition regardless of actual conditions existing at the time the analysis is done.

5.3.3.6 Post development conditions for off site areas shall be determined the same as in Section 5.3.3.5 of this IIM. Post development conditions for the project site shall be determined based on the proposed ultimate development for the site.

5.4 Water Quality Control

5.4.1 Except for those land disturbing activities noted as exempt in Section 4.8 of this IIM, a water quality control plan shall be developed for each land disturbing activity exceeding the land disturbance thresholds noted in Section 4.1 of this IIM.

5.4.2 Compliance with the water quality criteria may be achieved by applying the performance based criteria or the technology based criteria methodology. Discussion on each of these methodologies, as they relate to VDOT land disturbing activities, is found in the following sections of this IIM. Additional discussion on these methodologies can be found in Volumes I and II of the Virginia SWM Handbook.

5.4.3 Performance Based Criteria

5.4.3.1 The calculated post development non-point source pollutant runoff load from the site shall be compared to the calculated pre-development pollutant load from the site based upon the average land cover condition or the existing site condition as related to the site's percent impervious.

5.4.3.2 The site's percent impervious shall be determined as follows:

- For pre-development conditions -The total pre-development impervious area of the site divided by the total pre-development area of the site.

- For post development conditions -The total post development impervious area of the site divided by the total post development area of the site.

5.4.3.3 A BMP shall be located, designed, and maintained to achieve the target pollutant removal efficiencies specified in Table 1 in order to effectively reduce the post development pollutant load from the site to the required level based upon the following four applicable land development situations for which the performance criteria apply:

1. Situation 1 consists of land disturbing activities where the pre-development percent impervious cover of the site is less than or equal to the average land cover condition (16%) and the proposed improvements will create a total post development percent impervious cover of the site which is less than the average land cover condition (16%).

    - Water Quality Requirement: No reduction in the post development pollutant discharge from the site is required.

2. Situation 2 consists of land disturbing activities where the pre-development percent impervious cover of the site is less than or equal to the average land cover condition (16%) and the proposed improvements will create a

total post development percent impervious cover of the site which is greater than the average land cover condition (16%).

- Water Quality Requirement: The post development pollutant discharge from the site shall not exceed the pre-development pollutant discharge from the site based on the average land cover condition (16%).

3. Situation 3 consists of land disturbing activities where the pre-development percent impervious cover of the site is greater than the average land cover condition (16%).

- Water Quality Requirement: The post development pollutant discharge from the site shall not exceed (a) the pre-development pollutant discharge from the site less 10% or (b) the pollutant discharge based on the average land cover condition (16%), whichever is greater.

4. Situation 4 consists of land disturbing activities where the pre-development impervious cover of the site is served by an existing stormwater management BMP that addresses water quality.

- Water Quality Requirement: The post development pollutant discharge from the site shall not exceed the pre-development pollutant discharge from the site based on the existing percent impervious cover of the area being served by the existing BMP. The existing BMP shall be shown to have been designed and constructed in accordance with proper design standards and specifications, and to be in proper functioning condition.

5.4.4 Technology Based Criteria

- The stormwater run-off from the impervious cover of the land disturbing activity shall be treated by an appropriate BMP as specified in Table 1 based on the applicable percent impervious cover of the site.

5.4.4.1 The applicable percent impervious cover of the site shall be as follows:

- For linear development projects – The net increase in impervious area of the site (total post development impervious area of the site minus the total pre-development impervious area of the site) divided by the total post development area of the site.
- For Non- Linear Projects – See Section 5.4.3.2 of this IIM.

5.4.4.2 The water quality volume for any required BMP shall be based on the total post development impervious area within the site draining to the BMP.

TABLE 1 BMP SELECTION TABLE		
Water Quality BMP	Target Phosphorus Removal Efficiency	Applicable Percent Impervious Cover of Site
Vegetated filter strip Grassed swale	10% 15%	16-21%
Constructed wetlands Extended detention (2xWQV) Retention basin I (3xWQV)	30% 35% 40%	22-37%
Bioretention basin Bioretention filter Extended detention-enhanced Retention basin II (4xWQV) Infiltration (1xWQV)	50% 50% 50% 50% 50%	38-66%
Sand filter Infiltratration (2xWQV) Retention basin III (4xWQV with aquatic bench)	65% 65% 65%	67-100%

5.4.5 Innovative or alternative BMPs not included in Table 1 may be allowed at the discretion and approval of the DCR. Approval to use such is to be coordinated between the VDOT State Hydraulics Engineer and the DCR VSMP Manager.

5.4.6 When the 1 year storm is detained for 24 hours (in accordance with Section 5.2.6 of this IIM) there will be no need to provide additional or separate storage for the WQV if it can be demonstrated that the WQV will be detained for approximately 24 hours.

5.4.7 Water Quality Offsets

Where the water quality requirements for the land development activity can not be met on-site or, in the case of a linear development project, at a specific outfall/discharge point from the site, water quality offsets can be used to achieve compliance with the requirements of the VSMP Regulations. Water quality offsets need to be provided within the same watershed (based on) as where originally required.

5.4.8 The following information is taken from the the current VSMP Regulations and the Virginia SWM Handbook.

5.4.8.1 The selected BMP shall be located, designed, and maintained to perform at the target pollutant removal efficiency specified in Table 1. Design standards and specifications for the BMPs in Table 1 that meet the required target pollutant removal efficiency are available in the Virginia SWM Handbook. Additional information can also be found on the Virginia Stormwater BMP Clearing House website http://www.vwrrc.vt.edu/swc/ .

5.4.8.2 Extended Detention Basins and Extended Detention Basins Enhanced require a WQV of two times the standard WQV or 1 inch of run-off from the post development impervious area of the site draining to the BMP.

5.4.8.3 Extended Detention Basins and Extended Detention Basins Enhanced require a 30 hour drawdown time for the required WQV. If the required orifice size to achieve the 30 hour draw down time is found to be significantly less than 3 inches, an alternative water quality BMP should be investigated for use, such as a linear facility that treats the WQV and allows larger storms to bypass. The calculation procedure for the drawdown time and orifice sizing is shown on Pages 5-33 through 5-38 of the Virginia SWM Handbook.

5.4.8.4 In order to facilitate maintenance, sediment forebays are be incorporated into the design of Extended Detention Basins and Extended Detention Basins Enhanced. The volume of the forebay should be 0.1 inch – 0.25 inches times the impervious area treated by the facility or 10 percent of the required detention volume. See Pages 3.04-1 through 5 of the Virginia SWM Handbook for details.

5.4.8.5 The overflow spillway shall be stabilized utilizing rip rap, concrete or other non-erodible material.

5.4.8.6 Suggested details for the Extended Detention Basin are shown on Pages 3.07-4 and 5 of the Virginia SWM Handbook. The riprap lined low flow channel through the basin is not recommended due to maintenance considerations.

5.4.8.7 Suggested details for the Extended Detention Basin Enhanced are shown on Pages 3.07-6 and 7 of the Virginia SWM Handbook. The geometric shape of the facility may need to be more symmetrical than that shown in order to facilitate construction of the basin to the dimensions needed.

5.4.8.8 Non-structural practices including, but not limited to, minimization of impervious areas and curbing requirements, open space acquisition, floodplain management, and protection of wetlands may be utilized as appropriate in order to at least partially satisfy the water quality requirements. Approval to use such non-structural measures is to be secured in advance from the DCR and is to be coordinated between the VDOT State Hydraulics Engineer and the DCR VSMP Manager.

6.0 OTHER DESIGN CRITERIA / CONSIDERATIONS

6.1 The analysis to demonstrate compliance with the requirements of Section 5.2 and 5.3 of this IIM (MS 19 of the Virginia ESC Regulations) shall be performed in accordance with the procedures noted in the DCR Technical Bulletin No. 1 (Stream Channel Erosion Control Policy Guidance).

6.2 Increased volumes of sheet flow due to the proposed development that may cause erosion and sedimentation on adjacent property shall be diverted to a stable outfall, an adequate channel, pipe or storm sewer system or to an appropriate SWM facility.

6.3 All on site channels (including culverts and storm sewer systems) must be designed/verified to be adequate in accordance with Sections 5.2 and 5.3 of this IIM (MS 19 of the Virginia ESC Regulations).

6.4 Impounding structures (dams) that are not covered by the Virginia Dam Safety Regulations shall be reviewed for structural integrity and floodplain impacts during the passage of the 100 year storm event.

6.5 Outflows from stormwater management facilities shall be discharged into an adequate receiving channel as defined in Section 5.2 and 5.3 of this IIM (MS 19 of the Virginia ESC Regulations).

6.6 Existing swales being utilized as natural or man-made outfall conveyances for pre-development run-off will be considered as channels and, if the swale satisfactorily meets the criteria contained in Section 5.2 and 5.3 of this IIM (MS 19 of the Virginia ESC Regulations) for the post development run-off, it will be considered an adequate receiving channel.

6.7 Construction of stormwater management facilities within a 100 year flood plain should be avoided whenever possible. Where this is unavoidable, a thorough review shall be made to ensure that the stormwater management facility will operate effectively during the passage of the 10 year flood event. The stormwater management facility shall also be reviewed for structural stability during the passage of the 100 year flood event on the floodplain and for any potential impacts to the 100 year flood characteristics of the floodplain. The construction of stormwater management facilities shall be in compliance with all applicable regulations under the FEMA's National Flood Insurance Program.

6.8 Construction of stormwater management facilities within a sinkhole is prohibited. If stormwater management facilities are required along the periphery of a sinkhole, the design of such facilities shall comply with the guidelines in the latest IIM-LD-228 (Sinkholes) and the DCR's Technical Bulletin No. 2 (Hydrologic Modeling and Design in Karst) and applicable sections of the Virginia SWM Handbook.

6.9 Design of any stormwater management facilities with permanent water features (proposed or potential) located within five (5) miles of a public use or military airport is to be reviewed and coordinated in accordance with Section A-6 of the VDOT Road Design Manual.

7.0 REGIONAL FACILITIES

7.1 There are many cases where it is more feasible to develop one major stormwater management facility to control a large watershed area rather than a number of small individual facilities controlling small drainage areas within the large watershed. The concept of regional stormwater management facilities is endorsed by the VDOT provided that certain requirements are met.

7.1.1 Development and use of regional stormwater management facilities must be a joint undertaking by the VDOT and the local governing body. The site must be part of a master stormwater management plan developed and/or approved by the local governing body and any agreements related to the VDOT use of these facilities must be consummated between the VDOT and the local governing body. The VDOT may enter into an agreement with a private individual or corporation provided the local governing body has a SWM program that complies with the VSMP Regulations and the proper agreements for maintenance and liability of the regional facility have been executed between the local governing body and the private individual or corporation.

7.1.2 Where an existing or potential VDOT roadway embankment serves as an impounding structure for a regional facility, the right of way line will normally be set at the inlet face of the main drainage structure. The local government would be responsible for the maintenance and liabilities outside of the right of way and the VDOT would accept the same responsibilities inside the right of way.

7.1.3 The design of regional stormwater management facilities must address any mitigation needed to meet the water quality and quantity requirements of proposed or future roadway projects within the contributing watershed. Regional swm facilities located upstream of a roadway project shall provide sufficient mitigation for any water quality and quantity impacts of run-off from the roadway project which may bypass the facility.

7.2 Any questions or concerns related to the the use of an off site regional swm facility to satisfy the VDOT post construction swm requirements should be discussed with the DCR prior to entering into any agreements with either private or public entities.

8.0 MULTI-USE SWM BASINS

8.1 SWM basins may function as both quantity control and quality control facilities. Some basins may only be needed for quality control.

8.2 SWM basins are typically utilized as temporary sediment basins during the construction phase of the project and the design of the swm basin will need to address this dual function. The design that is needed for a permanent swm basin may need to be altered to provide additional temporary sediment storage volume that is in excess of the required WQV. For design purposes, the two volumes (WQV and temporary sediment storage volume) should not be added together but rather the larger of the two should govern the basin's design.

8.2.1 The additional volume needed for temporary sediment storage may be provided by excavating the bottom of the basin lower than that required for the WQV. The basin's permanent outlet control structure can be temporarily altered to serve as the control structure for the temporary sediment basin (see Standard SWM-DR of VDOT's R&B Standards and the Virginia ESC Handbook). When the project is

nearing completion and the basin is no longer needed for temporary sediment control, the basin can be converted to satisfy the permanent swm basin requirements by regrading (excavating and/or filling) and removing any temporary control structure appurtenances.

9.0 PLAN PREPARATION

9.1 Complete (C) and Minimum (M) plan projects shall show stormwater management and erosion control measures in the plan assembly as directed in the latest version of IIM-LD-11, the VDOT Drainage Manual and the VDOT Road Design Manual.

9.2 No-plan (N) and other types of projects (including maintenance activities) that have an abbreviated plan assembly must conform to the requirements of the ESC and VSMP Regulations where the land disturbance value exceeds the land disturbance thresholds for such. For the definition of these types of projects, and the procedures for addressing both the erosion and sediment control and stormwater management plan details for such projects, see the latest version of IIM-LD-11, the VDOT Drainage Manual and the VDOT Road Design Manual.

10.0 FOUNDATION DATA

10.1 Foundation data (a soil boring) for the base of the dam should be requested for all stormwater management basins in order to determine if the native material will support the dam and prevent ponded water from seeping under the dam. An additional boring near the center of the basin should also be requested if:

1. Excavation from the basin may, potentially, be used to construct the dam, or
2. There is potential for rock to be encountered in the area of excavation, or
3. A high water table is suspected that may alter the performance of the swm basin.

10.2 For large basins, more than one boring for the dam and one boring for the area of the basin may be needed. The number and locations of the borings are to be determined by the VDOT Hydraulics Engineer and/or the VDOT Materials Engineer.

10.3 The foundation data for the swm basin should be requested by the VDOT Hydraulics Engineer at the same time that the request for culvert foundation data is initiated.

11.0 RIGHT OF WAY

11.1 Permanent stormwater management facilities may be placed in fee right of way or in permanent easements.

11.1.1 It is recommended that all permanent stormwater management features (dams, risers, storage area etc.) be placed within fee right of way initially. Outfall ditches and similar features may initially be placed in permanent easements.

11.1.2 The final decision on right of way versus permanent easement should be made prior to the Right of Way (or similar) phase of the project development process based on information obtained at the Field Inspection, Design Public Hearing and/or other such plan review milestones.

11.2 The Department will generally be amenable to the desires of the affected landowners regarding the fee right of way/permanent easement issue.

11.3 The multiple use of property for stormwater management facilities and other features, such as utilities, is permissible. The decision on the advisability of such actions must be made on an individual case basis.

12.0 DESIGN DETAILS

12.1 The following details are to be incorporated into the design of VDOT stormwater management basins in order to be in compliance with the VSMP Regulations and the Virginia SWM Handbook. These details address concerns with seepage through the dam and along the culvert due to the ponding of water in the basins for durations greater than that associated with typical culvert installations.

12.1.1 The foundation material under the dam and the material used for the embankment of the dam shall be an AASHTO Type A-4 or finer and/or meet the approval of the VDOT Materials Division. If the native material is not adequate, the foundation of the dam is to be excavated and backfilled a minimum of 4 feet or the amount recommended by the VDOT Materials Division. The backfill and embankment material must meet the soil classification requirements identified herein or the design of the dam may incorporate a trench lined with a membrane (such as bentonite penetrated fabric or an HDPE or LDPE liner). Such designs shall be reviewed and approved by the VDOT Materials Division before use.

12.1.2 The pipe culvert under or through the dam is to be reinforced concrete pipe with rubber gaskets. The pipe and gaskets are to comply with the following VDOT Road and Bridge Specifications:

- Pipe - Section 232 (AASHTO M170)
- Gasket - Section 212 (ASTM C443)

12.1.3 A concrete cradle is to be used under the pipe through the dam in order to prevent seepage. The concrete cradle is to begin at the riser or inlet end of the pipe and extend the full length of the pipe (see Standard SWM-DR of VDOT's R&B Standards).

12.1.4 If the height of the dam is greater than 15' or if the basin includes a permanent water pool, the design of the dam is to include a homogenous embankment with seepage controls or zoned embankment or similar design in accordance with the Virginia SWM Handbook and recommendations of the VDOT Materials Division.

12.1.5 The top width of the dam is to be 10' minimum in order to facilitate both construction and maintenance operations.

12.1.6 The side slopes of the basin are to be no steeper than 3:1 to facilitate mowing and maintenance inspections/operations.

12.1.7 The longitudinal slope along the bottom of the basin should be no greater than 2% nor less than 0.5%.

12.1.8 The depth of the basin from the lowest bottom elevation to the primary outflow point (top of riser or invert of orifice or weir) should be no more than 3 feet in order to reduce the hazard potential. If the depth needs to be more than 3 feet, fencing (or other means to limit access) of the basin site should be considered.

12.1.9 The primary control structure (riser or weir) should be designed to operate in weir flow conditions for the full range of design flows. Where this is not possible or feasible and the control structure will operate in orifice flow conditions at some point within the design flow range, an anti-vortex device, consistent with the design recommendations in the Virginia SWM Handbook, shall be utilized.

12.1.10 The length to width ratio of the basin should be about 3:1, with the widest part of the basin at the outlet end. If the ratio is less than about 2:1, and if there is concern that the velocity of flow through the basin will be high, consideration should be given to using baffles within the basin to reduce velocity and increase flow time through the basin.

13.0 PERIMETER CONTROLS

All SWM basins should be reviewed for the needs of fencing, barricades and no trespassing signs in accordance with the following guidelines.

13.1 Fencing

13.1.1 Fencing of stormwater management basins is normally not required and should not be considered for most basins due to:

- Insignificant Hazard – For detention basins (no permanent water pool), significant ponding of water in the basin should only occur with very heavy rainfall events and the maximum ponded depth should typically be no more than about 3 feet. Ponds and lakes are almost never fenced, even though they may be located in subdivisions and have deep, permanent water pools.

- Limits Maintenance – Fencing could hinder the performance of both routine and long term maintenance operations. Fencing could become damaged during major maintenance operations and have to be repaired or replaced.

13.1.2 Fencing of SWM basins may occasionally be needed and should be considered when:

1. The basin is deep with a maximum ponded depth greater than about 3' and/or has steep side slopes with 2 or more sides steeper than 3:1, or

2. The basin is in close proximity to schools, playgrounds or similar areas where children may be expected to frequent, or

3. It is recommended by the VDOT Field Inspection Review Team (or other such plan reviewing group), the VDOT Residency Administrator or the City/County (where City/County will assume maintenance responsibility).

13.1.3 Where fencing is proposed, access gate(s) of sufficient size to accommodate maintenance equipment are to be provided. Appropriate security mechanisms for the gates are to be provided to prevent/deter unauthorized entry.

13.2 Barricades

For non-fenced basins, a chain barricade (see Standard CR-1 of VDOT's R&B Standards) or gate may be needed across the vehicular entrance to prohibit non-authorized access if there is a concern with illegal dumping or other undesirable activities at the site.

13.3 Signs

"No Trespassing" signs shall be considered for use on all basins, whether fenced or unfenced, and should be recommended, as needed, by the VDOT Field Inspection Review Team or other such plan reviewing group.

14.0 MAINTENANCE

- Requirements for maintenance of stormwater management facilities, the schedule for inspection and maintenance operations, and the identification of persons responsible for the maintenance will be addressed in the VDOT's Annual ESC and SWM Standards and Specifications, as approved by the DCR.

15.0 REPORTING

15.1 The VDOT is required to submit an annual report to the DCR that identifies the location, number and type of stormwater management facilities installed during the preceding year, their storage capacities, the affected water body, and a summary of any water quality monitoring data associated with the facility. The reporting period is from July 1 to June 30.

15.2 A database has been established on the VDOT Central Office Hydraulics Section's web system to record the required data for all VDOT projects.

15.2.1 It shall be the responsibility of the VDOT District Hydraulics Engineer or VSMP Construction Permit Coordinator to ensure that the required information is logged into the database for all post construction stormwater management facilities that are installed on VDOT projects in their respective areas.

15.2.2 Information is to be logged into the data base when the VSMP Permit Termination Notice Form (LD-445D) is submitted with the as built BMP information (see the latest version of IIM-LD-242 and IIM-LD-246).

16.0 PLAN DETAILS

16.1 Stormwater Management Drainage Structure – R&B Standard SWM-1

- To be used at all applicable locations where a riser type of control structure is desired.

- At locations where a riser type structure is desired but a Standard SWM-1 structure will not satisfy site specific characteristics, a special design structure is to be utilized with appropriate details developed and included in the plan assembly or other such construction documents.

16.2 Stormwater Management Dam

- To be used at locations where a wall type control structure is desired (includes modifications to standard endwalls). Normally used where shallow depths of ponding are desired/required.
- Appropriate details are to be developed and included in the plan assembly or other such construction documents for individual locations to fit site specific conditions.

16.3 Stormwater Management Details – Road and Bridge Standard SWM-DR

- Includes details for debris rack, trash rack, concrete cradle, water quality orifice and modifications for use of SWM facility as a temporary sediment basin.
- Specify at each SWM facility location requiring any of the noted items.
- The size opening for the water quality orifice or other required openings in the control structure shall be specified in the description for the control structure for each SWM facility.

16.4 Access

- A means of access for inspection and maintenance personnel shall be provided at each SWM facility location. The Standard PE-1 details shown in VDOT's Road and Bridge Standards should be used for vehicular entrances.
- A turnaround area is to be provided at or near the terminus of each vehicular entrance.
- An appropriate all weather surface material shall be provided for each vehicular entrance.
- See Section 13.0 of this IIM for requirements for access control.

17.0 METHOD OF MEASUREMENT – BASIS OF PAYMENT

17.1 Stormwater Management Drainage Structure – Road and Bridge Standard SWM-1 and other similar types of control structures.

- Basis of payment to be linear feet measured from invert of structure to top of concrete. Price bid includes cost of trash rack, debris rack and holder, temporary dewatering device and temporary metal plates.

17.2 Stormwater Management Dam

- Basis of payment to be cubic yards of Concrete Class A3 Miscellaneous and pounds of Reinforcing Steel.

17.3 Concrete Cradle

- Basis of payment to be cubic yards of Concrete Class A3 Miscellaneous.

17.4 Excavation for stormwater management facilities will be measured and paid for as cubic yards of Stormwater Management Basin Excavation.

17.5 Fill material needed for dams or berms will be measured and paid for as cubic yards of Regular Excavation, Borrow Excavation or Embankment, as appropriate.

17.6 The Grading Diagram and/or the Grading Summary is to reflect how the cubic yards of Stormwater Management Basin Excavation and cubic yards of Embankment or Borrow, if needed, are to be distributed.

18.0 STORMWATER MANAGEMENT SUMMARY

18.1 All drainage items related to the construction of stormwater management facilities shall be summarized, by location, in the Drainage Summary for the project.

18.2 All incidental items related to the construction of stormwater management facilities shall be summarized, by location, in the Incidental Summary for the project.

18.3 Stormwater Management Excavation and Borrow or Embankment, if needed, are to be included in the totals on the Grading Diagram and/or Summary.

19.0 EFFECTIVE DATE

- The effective date for implementing the guidelines and criteria contained in Section 5.4.4.2 of this IIM regarding water quality volume shall be based on the date of this IIM and as follows.

19.1 Design/Bid/Build Projects

19.1.1 For projects that **have not** been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required):

- **Full Implementation.**

19.1.2 For projects that **have** been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required) but which must **repeat** that process because of reasons other than changes related to this IIM:

- **Full Implementation**

19.1.3 For projects that **have** been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required) but which **have not** progressed to the PAC or similar phase (based on the normal time schedule for such):

- **Implementation to the extent practicable within the identified right of way requirements except where the project construction schedule will be compromised in doing so.**

19.1.4 For projects that **are** at the PAC or similar phase (based on the normal time schedule for such):

- **Exempt from any type of implementation**

19.2 PPTA Projects

19.2.1 For projects that **have not** been advertised for a Public Hearing/Willingness and where a contract **has not** been executed with the selected Concessionaire:

- **Full Implementation**

19.2.2 For projects where a contract **has not** been executed with the selected Concessionaire and the project **has** been advertised for a Public Hearing/Willingness but which must **repeat** that process because of reasons other than changes related to this IIM:

- **Full Implementation**

19.2.3 For projects that **have** been advertised for a Public Hearing/Willingness but where a contract with the selected Concessionaire **has not** been executed:

- **Implementation to the extent practicable within the identified right of way requirements except where the project construction schedule will be compromised in doing so.**

19.2.4 For projects where a contract **has been** executed with the selected Concessionaire:

- **Exempt from any type of implementation**

19.3 Design Build Projects

19.3.1 For projects that **have not** been advertised for a Public Hearing/Willingness and where an RFP **has not** been advertised:

- **Full Implementation**

19.3.2 For projects where an RFP **has not** been advertised and the project **has** been advertised for a Public Hearing/Willingness but which must **repeat** that process because of reasons other than changes related to this IIM:

- **Full Implementation.**

19.3.3 For projects that **have** been advertised for a Public Hearing/Willingness but where an RFP **has not** been advertised:

- **Implementation to the extent practicable within the identified right of way requirements except where the project construction schedule will be compromised in doing so.**

19.3.4 For projects where an RFP **has** been advertised:

- **Exempt from any type of implementation.**

19.4 There may be projects that will not exactly fit into any one of the scenarios identified in Sections 19.1, 19.2 or 19.3. In those situations, a project by project decision on implementation of the water quality volume requirements contained in Section 5.4.4.2 of this IIM will have to be made. The State Hydraulics Engineer or the respective District Hydraulics Engineer should be consulted for assistance, as needed. The expectation is that VDOT will implement the revised water quality volume requirements contained in this IIM on all projects where it is reasonable and feasible to do so.

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: CULVERT DESIGN	NUMBER: IIM-LD-214.2
SPECIFIC SUBJECT: COUNTERSINKING AND LOW FLOW CONSIDERATIONS FOR SINGLE AND MULTIPLE BARREL CULVERTS	DATE: July 27, 2006
	SUPERSEDES: IIM-LD-214.1
DIVISION ADMINISTRATOR APPROVAL: Mohammad Mirshahi, P.E. State Location and Design Engineer Approved July 27, 2006	

EFFECTIVE DATE

- This memorandum is effective upon receipt. Shading has been omitted.

1.0 DEFINITIONS

1.1 Stream Bed – The substrate along the length of a stream, which lies below the ordinary high water elevation. The substrate may consist of organic matter, bedrock or inorganic particles that range in size from clay to boulders, or a combination of materials. Areas contiguous to the stream bed, but above the ordinary high water elevation, are not considered part of the stream bed.

1.2 Culvert – A culvert is generally defined as an enclosed structure that is used to convey surface waters from one side of an embankment to the other. For the purposes of this IIM there is no distinction between temporary and permanent culvert installations.

2.0 POLICY

2.1 The District Environmental staff will determine if the culvert impacts a jurisdictional stream bed (US Army Corps of Engineers) and will notify the appropriate project authority and the Hydraulic Engineer when the below requirements must be incorporated into the design.

2.2 Culverts constructed in jurisdictional stream beds are required to have the upstream and downstream inverts set (countersunk) below the natural stream bed elevation to stimulate natural stream bed establishment within the culvert and to meet the requirements of the environmental permitting process. The countersinking requirement does not apply to floodplain culverts or extensions or maintenance of existing structures where the existing structure will remain in service.

2.3 When performing the hydraulic analysis for any culvert installation that is to be countersunk, the analysis shall either:

1) Consider the hydraulic opening as being that above the countersunk portion of the culvert, or
2) Determine the required hydraulic opening (size) based on no countersinking; then specify the next larger size structure (3” or 6” greater height as appropriate) with the additional opening installed below the steam bed.

2.4 When performing a hydraulic analysis for any multiple barrel culvert crossing, it is appropriate to consider the natural channel and flood plain configuration as projecting through the crossing, the same as if it were a bridge spanning a flood plain. For the purpose of determining the hydraulic capacity of the crossing, any culvert area that is outside the natural channel area and below the flood plain elevation will be considered obstructed and, therefore, not available for hydraulic conveyance.

2.5 Culverts will be adequately sized to allow for the passage of ordinary high water with the countersinking, invert and flood plain restrictions taken into account.

2.6 If the culvert is greater than 24” (or equivalent) in diameter, the inlet and outlet ends shall be countersunk a minimum of 6” below the natural stream bed. If the culvert is 24” (or equivalent) or less in diameter, the inlet and outlet ends shall be countersunk a minimum of 3” below the natural stream bed.

3.0 MULTIPLE BARREL CULVERTS

3.1 When multiple barrel culverts are used, the 6" countersink requirement may only be needed for one barrel. The Hydraulic Engineer should determine whether it is appropriate and/or feasible to countersink one barrel or all of the barrels considering the following:

3.1.1 Width of Normal Stream - The width of the culvert barrel(s) receiving the low flow should approximate the width of the normal stream to avoid accelerating velocities (at normal flow) through the culvert.

3.1.2 Width of Floodplain - Narrow and constricted floodplains may necessitate all barrels being at the lowest possible elevation. Wide floodplains with significant over bank areas may permit one barrel to be countersunk and the remaining barrels to be either at the floodplain elevation or at an elevation slightly higher than the natural stream bed.

3.1.3 Pipe Culverts – Pipe Culverts may be designed to have barrels at different invert elevations. However, special provisions are needed to ensure proper bedding and backfill. Special Design Endwalls will be required. These considerations may negate any potential cost savings associated with not countersinking all barrels a like amount.

3.1.4 Box Culverts - Precast box culverts may be designed to have barrels at different invert elevations. In doing so, the installation is usually configured with the top of all barrels at the same elevation. This will require the same special considerations for bedding, backfill and endwall design as noted in Section 3.1.3. Cast in place box culverts usually have all barrels of the same size and elevation in order to construct the box culvert using standard details.

3.2 Multiple barrel culverts that are constructed with all barrels countersunk shall provide measures for directing the low flow through one or more barrels that approximate the width of the normal stream.

3.2.1 If the normal stream width is approximately equal to the total span of all barrels, low flow diversion measures normally should not be needed. If the Hydraulic Engineer elects not to utilize a low flow diversion structure, the District Environmental Manager shall be notified of the decision and be provided justification in order to advise the environmental review agencies during the permitting process.

3.2.2 When low flow diversion measures are needed, they shall be constructed to permit the stream to continue the natural meander or moving process normally associated with flood flows. The low flow diversion structures shall be constructed of rip rap, or other similar material. The rip rap material used should be small enough to allow movement during flood events (i.e., Class I Dry Rip Rap).

See Standard Insertable Sheet isd1588.dgn “Low Flow Diversion for Multiple Line Culvert Installations” for standard low flow diversion details.

3.2.3 Other methods of achieving the desired low flow conditions may also be employed. These shall be reviewed and approved by the District Environmental Manager.

4.0 SPECIAL CULVERT INSTALLATIONS

4.1 Culverts on Bedrock: If the bedrock prevents countersinking, evaluate the use of a three-sided structure to cross the waterway or evaluate alternative locations for the new culvert that will allow for countersinking. If none of these alternative measures are practicable, the Hydraulic Engineer shall submit documentation to the District Environmental Manager, including the cost, engineering factors, and site conditions that prohibit countersinking the culvert, and shall coordinate the evaluation of options to minimize disruption of the movement of aquatic life. Options that must be considered include partial countersinking (such as less than 3” of countersinking, or countersinking of only one end of the culvert), constructing stone step pools and low rock weirs downstream of the culvert, or other measures that provide for the movement of aquatic life.

NOTE: Blasting of bedrock stream bottoms through the use of explosives is not acceptable as a means of providing for countersinking of pipes on bedrock.

4.2 Culverts on Steep Terrain: Culverts on steep terrain (slope of 5% or greater) may generate flow velocities that cause excessive scour at the outlet and may prevent the establishment of a natural bed of material through the culvert. Should this situation present itself, the Hydraulic Engineer shall coordinate the evaluation of alternatives to countersinking. These include partial countersinking of the inlet end and implementation of measures to minimize any disruption of the movement of aquatic life, constructing a stone step/pool structure, using river rock/native stone rather than riprap or constructing low rock weirs to create a pool or pools.

Stone structures should be designed with sufficient-sized stone to prevent erosion or washout and should include keying-in as appropriate. These structures should be designed both to allow for aquatic life passage and to minimize scour at the outlet. The Hydraulic Engineer shall submit documentation to the District Environmental Manager, including the cost, engineering factors, and site conditions that prohibit countersinking the culvert, and shall coordinate the evaluation of options to minimize disruption of the movement of aquatic life.

4.3 Culverts at the Confluence of Two Streams: The outlet end of culverts that discharge a tributary directly into another stream must be countersunk below the natural stream bed at the discharge point. If this measure is not practicable, the Hydraulic Engineer shall submit documentation to the District Environmental Manager, including the cost, engineering factors, and site conditions that prohibit countersinking the culvert, and shall coordinate the evaluation of options to minimize disruption of the movement of aquatic life.

4.4 Other unusual circumstances that prohibit countersinking shall be evaluated on a case-by-case basis. The Hydraulic Engineer shall submit documentation to the District Environmental Manager, including the cost, engineering factors, and site conditions that prohibit countersinking the culvert, and shall coordinate the evaluation of options to minimize disruption of the movement of aquatic life.

4.5 Proposed culverts that do not include countersinking are subject to environmental agency review and approval and may require additional documentation or evaluation of other alternative measures.

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: SINKHOLES	NUMBER: IIM-LD-228.1
SPECIFIC SUBJECT: GUIDELINES FOR THE DISCHARGE OF STORMWATER AT SINKHOLES	DATE: SEPTEMBER 12, 2008
	SUPERSEDES: IIM-LD-228
LOCATION AND DESIGN DIVISION APPROVAL: Mohammad Mirshahi, P.E. State Location and Design Engineer Approved September 10, 2008	
MATERIALS DIV. APPROVAL: Charles A. Babish, P.E. Approved August 26, 2008	ENVIRONMENTAL DIV. APPROVAL: Stephen J. Long Approved August 28, 2008

Changes are shaded.

CURRENT REVISION

- Revised IIM to change the Scoping Form LD-430 to PM-100.

EFFECTIVE DATE

- These instructions are effective upon receipt.

PURPOSE

- The purpose of these guidelines is to:

    1. Increase awareness of the regulatory requirements for controlling stormwater runoff into sinkholes and identify the applicability of this guidance and the environmental regulations.

2. Provide design guidance for the discharge of stormwater into sinkholes.
3. Provide design details for addressing sinkholes directly impacted by the roadway embankment.
4. Provide guidance to comply with the Environmental Protection Agency (EPA) regulatory requirements to complete an inventory of "improved" sinkholes.

- These guidelines are applicable to roadways and drainage outfall facilities that are constructed and maintained by VDOT and similar facilities that are constructed by others but which will be ultimately maintained by VDOT, such as subdivision streets and associated drainage outfalls.

BACKGROUND

- Sinkholes are found in areas of karst terrain. Karst terrain is generally formed over limestone and dolomite formations. Karst terrains primarily occur within the Valley and Ridge Physiographic Province of western Virginia. Karst type terrains are also known to occur in very limited areas of the Blue Ridge, Piedmont and Coastal Plain Physiographic Provinces of Virginia. While information contained in these guidelines is directed more to those sinkholes located in the Valley and Ridge Physiographic Province, the same considerations should be applied to sinkholes located in other areas of the state.

- Karst terrain is characterized by closed depressions (sinkholes), caves, and underground drainage resulting from the solutions of the calcium and/or magnesium carbonates. Sinkholes may develop either by solution of the surficial rocks or collapse of underlying caves. The actual rock cavity may or may not be choked by residual soil and debris. It is the potential instability of the sinkhole infilling, most often associated with changes in the local hydrology, which traditionally has been the concern of the construction industry. Those concerns have now broadened to include the potential impacts of construction on the area's hydrology and water quality.

REGULATIONS

- Pursuant to the Safe Drinking Water Act, the Environmental Protection Agency (EPA) regulates the discharge of stormwater runoff into "improved" sinkholes through their Underground Injection Control (UIC) Program. The improvement of sinkholes, and subsequent directing of water into the subsurface, is classified as underground injection. Improved sinkholes used for this purpose are classified as a Class V Underground Injection Wells and may require a permit to function as a recipient of stormwater runoff.

- The EPA classifies the following activities as sinkhole "improvements":

  - Cleaning out a sinkhole to facilitate drainage.

- Cutting a ditch to the base or mouth of a sinkhole.
- Piping stormwater runoff to a sinkhole.
- Cutting brush to facilitate stormwater flow to a sinkhole.

- The EPA does not regulate (i.e., require a permit for) stormwater discharges that flow naturally into sinkholes without modification to the sinkhole.

CONCERNS

- Both the EPA and VDOT have concerns with changes to the existing hydrology at sinkhole locations. These concerns include:

- Water Quality – Sinkholes are often direct links to underground sources of drinking water. Stormwater runoff from highways could potentially contain various constituents such as oil, grease, heavy metals and salt that could enter and impact these water supplies. The underground ecosystems could potentially be impacted by highway runoff containing sediment generated both during and following highway construction and material from potential spills resulting from traffic accidents once the highway is operational.

- Water Quantity – Directing additional stormwater flow to a sinkhole can result in the enlargement of the feature, create surface failures and erosion and cause flooding of adjacent property. Increasing the quantity of stormwater runoff flowing to a sinkhole can also cause the characteristics of the sinkhole opening to change in such a manner so as to restrict the flow into the subsurface, resulting in greater surface ponding in and around the area of the sinkhole.

- Instability – The area within and surrounding a sinkhole can settle or sink unexpectedly, resulting in loss of competent structural material and damage to overlying structures.

DESIGN CONSIDERATIONS

- The following design considerations must be followed for any projects involving the construction of highways or drainage outfalls in areas where sinkholes are present:

  - Avoidance – Determine if there are any feasible alternatives that would avoid construction in the area of the sinkhole. Where the sinkhole is the natural outfall for the stormwater runoff from the roadway area, determine if the stormwater runoff can be diverted away from the sinkhole to an adequate surface water channel. It should be recognized that drainage facilities to accommodate the diversion of stormwater runoff may require significant additional grading and right of way. In addition, stormwater quantity management facilities may be

required at the point where the diverted flow is released from the project right of way in order to avoid the liabilities inherent with stormwater runoff diversion.

- Minimization of Impacts from Direct Discharges – If avoidance is not possible, drainage outfalls from the roadway should include natural buffer zones between the outlet of the roadway drainage structure and the sinkhole in order to provide for a natural filtering process. Where stormwater runoff naturally terminates in sinkhole areas, vegetated flow areas (minimum 80' – 100' in length), runoff spreaders and vegetated swales should be used between the outlet of the roadway drainage structure and the bottom of the sinkhole in order to provide for filtering of the flow. If concentrated flow from the roadway pavement area is being directed into the bottom of the sinkhole, a stormwater management water quality basin or other type of water quality filtering device should be incorporated into the design. The water quality basin or filtering device should not be located in the bottom (throat) of the sinkhole (where the flow enters the ground) but rather should be located as close to the roadway or discharge point as practicable. Stormwater management basins constructed in these areas may require an impermeable lining in order to prevent impacts to the underlining soil and subsurface area. The District Materials Section should provide recommendations regarding this issue. A stormwater management basin may also be needed to provide attenuation of any increased flow quantity that may be directed toward the sinkhole.

- If stormwater runoff from a roadway project must be directed to a sinkhole, the area of the sinkhole should be investigated to determine if any existing ponding occurs during rainfall events. The drainage design for the project should reflect how the sinkhole is anticipated to function after completion of the construction activities. The project should be designed to avoid any flood damages resulting from potential blockage and ponding in the sinkhole area.

COORDINATION

- During the Scoping Phase of the Plan Development Process, the District Materials Section should identify those projects where visible sinkholes are present along the project corridor. The presence of sinkholes should be noted on Form PM-100 (LD-430), Scoping Report and, if possible, the approximate location of observed sinkholes should be identified. The project survey shall provide an accurate and detailed location and description of all identifiable sinkholes located within the survey boundaries.

- During the hydraulic analysis phase of the project development process, the Hydraulics Engineer should coordinate with the District Materials Section and the District Environmental Section if the project Scoping Report or survey data indicates the presence of sinkholes and if it is anticipated that those sinkholes might be impacted by stormwater runoff from the project.

PLAN DETAILS

- Where the roadway traverses over or through a sinkhole area, the sinkhole should be treated in accordance with one of the typical details shown on Standard Insertable Sheet No. isd/msd 2944 unless otherwise directed by the District Materials Engineer.

- Detail No. 1 should be used for sinkholes that receive stormwater runoff from relatively large areas and have a well-defined opening (throat). This treatment involves cleaning out soil and debris to expose the throat, installing a length of pipe to convey surface drainage into the sinkhole and backfilling with riprap and successive layers of smaller aggregate and a geotextile fabric prior to the placement of the regular roadway embankment material.

- Detail No. 2 should be used for sinkholes with broad, flat depressions and which have no defined throat. These sinkholes typically receive stormwater runoff from relatively small areas. The width of the roadway embankment is generally less than the width of the depression. This treatment involves the placement of riprap in the bottom of the roadway embankment to allow for the continued infiltration of surface flows. The riprap is capped with successive layers of smaller aggregate and a geotextile fabric before placement of the regular roadway embankment material.

- Detail No. 3 should be used for small shallow sinkholes that receive stormwater runoff from relatively small areas and where the roadway embankment will cover most or all of the depression. This treatment involves filling the depression with successive layers of smaller aggregate and a geotextile fabric before placement of the regular roadway embankment material. Since this treatment effectively “caps” the sinkhole and precludes the entry of surface water, a drainage ditch or other hydraulic conveyance is typically required along the edge of the roadway embankment to convey stormwater runoff to an adjacent outfall.

ROADSIDE DITCHES

- In areas of karst topography, roadside ditches with a gradient of less than 5% may need to be lined to inhibit the infiltration of surface waters. The District Materials Section should make this determination during the preliminary soils investigation phase of the project and, where applicable, include their recommendations for ditch lining with those other recommendations requested on Form LD-252 - Request for Supporting Data. Where ditch lining is recommended, the roadside ditches should be lined with concrete using Standard PG-2A or PG-5 (as applicable) or similar details. When using Standard PG-2A or PG-5 concrete ditches in these areas, the standard detail drawings will need to be modified to include the following:

    - Add a 30-mil polyethylene film beneath all joints (to extend 4 feet longitudinally in each direction).

- Show the location of the curtain wall (normally placed adjacent to each expansion joint) 4 feet downgrade of the expansion joint (to coincide with the end of the 30-mil polyethylene film).

- In areas where these modifications apply, the plan description should note "St'd. PG-2A Modified" or "St'd. PG-5 Modified", as applicable. The details for these modifications are included on the Sinkhole Insertable Sheet.

REPORTING REQUIREMENTS

- If direct discharge of runoff into a sinkhole is the only feasible option available and improvements (modifications) such as cleaning, clearing, etc. are needed in the lowest section of the sinkhole (where water enters the ground), the details of such improvements (modifications) must be discussed with the District Environmental Section in order that they can determine what permits and/or reporting will be required. Typical sinkhole improvements (modifications) that would fit into this category are depicted in Detail 1 and Detail 2 on Standard Insertable Sheet No. isd/msd 2944. These "improved" sinkhole sites are be brought to the attention of the District Environmental Section early in project development process in order to allow adequate time for coordination with the EPA and other applicable regulatory agencies. The Environmental Division's Form EQ-120 must be completed for those sites where it is determined necessary to "improve" a sinkhole and where it is determined such improvements would be regulated under the EPA's UIC Program. The Hydraulics Engineer shall be responsible for completing Form EQ-120 and submitting it to the District Environmental Hazardous Materials Manager for further processing.

SUBDIVISIONS AND FACILITIES BUILT BY OTHERS

- These Guidelines shall apply to roadways that are designed and constructed by others and which will ultimately be maintained by VDOT. In addition, where a sinkhole is being utilized as a drainage outfall, an acceptable legal agreement shall be executed that absolves VDOT of any liability and maintenance responsibilities associated with the sinkhole. The agreement should identify the County as the responsible party in the event that the developer or homeowners association cannot (or will not) assume the responsibility for liability or maintenance. A sample legal agreement can be found in Secondary Roads Division's publication "GUIDE FOR ADDITIONS, ABANDONMENTS, AND DISCONTINUANCES – SECONDARY SYSTEM OF STATE HIGHWAYS". The sample agreement shown in this publication is for stormwater management facilities but it can be modified slightly to cover the use of a sinkhole as a drainage outfall. The development of the agreement for the use of a sinkhole as an outfall should be coordinated with and approved by the Local Assistance Division in the Central Office.

SUMMARIZATION

- Quantities relative to sinkholes (Aggregate Material, Dry Rip Rap, etc.) are to be summarized in a separate summary.

PAY ITEMS

- Standard PG-2A Modified, Paved Ditch, S.Y./m^2
- Standard PG-5 Modified, Paved Ditch, S.Y./m^2
- 30-mil Polyethylene Film is included in the bid price for Standard PG-2A Modified and/or Standard PG-5 Modified Paved Ditch.
- Grate for EW-1 is included in the bid price for Standard EW-1 Endwall for Pipe Culverts.

INSERTABLE SHEET

- The following insertable sheets are available on Falcon DMS under the UPC# eng_ser, Division, for applicable plan assemblies:
  - Sinkhole Details, Drawing No. isd 2944 (Imperial), msd 2944 (Metric)
  - Paved Ditch PG-2A/ PG-5 Modified, Drawing No. isd 2945 (Imperial), msd 2945 (Metric)

FORM EQ-120 SINKHOLE INVENTORY

- Form EQ-120 is available inside VDOT at:

  http://bioapp10:89/

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: VIRGINIA STORMWATER MANAGEMENT PROGRAM	NUMBER: IIM-LD-242.3
SPECIFIC SUBJECT: GENERAL VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) CONSTRUCTION PERMIT	DATE: MARCH 19, 2010
	SUPERSEDES: IIM-LD-242.2
DIVISION ADMINISTRATOR APPROVAL:	Mohammad Mirshahi, P.E. State Location and Design Engineer Approved March 19, 2010

Changes are shaded.

CURRENT REVISION

- Revisions have been made throughout this memorandum to clarify the VSMP construction permit requirements.

EFFECTIVE DATE

- This memorandum is effective upon receipt.

ACRONYMS

- DCR – Department of Conservation and Recreation
- ESC – Erosion and Sediment Control
- IIM – Instructional and Informational Memorandum
- IAT – Interagency Transfer
- L&D – Location and Design
- PAC – Pre Advertisement Conference
- RLD – Responsible Land Disturber
- RLDA – Regulated Land Disturbance Activity
- SWM – Stormwater Management
- SWPPP – Stormwater Pollution Prevention Plan
- VDOT – Virginia Department of Transportation
- VSMP – Virginia Stormwater Management Program
- VSWCB – Virginia Soil and Water Conservation Board

BACKGROUND

- Acts of the General Assembly have resulted in the enactment of the Stormwater Management Law (Section 10.1-603 of the Code of Virginia) and the issuance of the Virginia Stormwater Management Program Permit Regulations (4 VAC 50-60 et seq.) for discharges of stormwater from Regulated Land Disturbing Activities. The law empowered the VSWCB to regulate, permit, and control stormwater runoff in the Commonwealth and authorized the VSWCB to delegate such powers to the DCR.

- Authorization to discharge under the VSMP Regulations and the Virginia Stormwater Management Act is permitted through the DCR's VSMP General Permit for the Discharge of Stormwater from Construction Activities VAR10 (hereafter referred to as the VSMP Construction Permit). The current permit became effective on July 1, 2009 and will expire on June 30, 2014. Coverage under the VSMP Construction Permit must be obtained prior to beginning any land disturbance on regulated activities.

APPLICATION

- The VSMP Construction Permit is applicable for all RLDAs undertaken by or for the VDOT including, but not limited to, RAAP, SAPP, Minimum and No Plan, PPTA and Design Build and Capital Outlay projects and routine and non routine maintenance activities, including those performed by state forces or hired equipment.

- VDOT shall apply for and secure coverage (in accordance with the instructions contained in this document) under the VSMP Construction Permit for all applicable land disturbing activities over which it has contractual control or which are done by state forces.

- It shall be the responsibility of those conducting land disturbing activities on VDOT right of way under agreement and/or a land use permit to secure coverage under the VSMP Construction Permit (if applicable) for their activities. This would include those land disturbing activities conducted on VDOT right of way by municipalities under the First Cities program, the Locally Administered Project program or the Transportation Enhancement Program.

- Coverage under the VSMP Construction Permit is required for all land disturbing activities, except those associated with routine maintenance, that equal or exceed the following land disturbance threshold amounts:

  - In a Designated Chesapeake Bay Preservation Area – 2,500 square feet
  - In all other areas – 1 Acre

- Coverage under the VSMP Construction Permit is required for all routine maintenance activities that disturb 5 acres or greater.

1. Routine maintenance is defined as those activities performed to maintain the original line and grade, hydraulic capacity, or original construction of the facility. Such activities include, but are not limited to, ditch cleaning operations, shoulder grading operations and pipe replacement or rehabilitation operations provided the original line and grade, hydraulic capacity and original construction of the project are maintained.

2. Changes affecting hydraulic capacity or original construction of a ditch could include, but are not limited to, changes to depth, width, side slopes, grade and lining. Likewise, changes affecting the hydraulic capacity or original construction of a drainage structure include, but are not limited to, changes in type, size, slope and material.

3. Where there is any question as to the application of the routine maintenance definition to a land disturbing activity, the appropriate District Hydraulics Engineer should be consulted.

- Routine maintenance activities that disturb less than five acres of land are exempt from the VSMP Construction Permit requirements.

1. This exemption is only for those maintenance activities considered routine (e.g., ditch cleaning operations, shoulder grading operations, pipe replacements, etc.) and only applies to the VSMP Regulations and Construction Permit Program. It does not apply to the ESC Program or to the SWPPP requirements. An ESC Plan (including MS-19 channel adequacy analysis, as appropriate) and a SWPPP is required for any land disturbing activity that equals or exceeds 10,000 square feet (2,500 square feet in the area defined as Tidewater, Virginia in the Chesapeake Bay Preservation Act) (See latest version of IIM-LD-11) regardless of any exemption under the VSMP Regulations and Construction Permit Program.

2. For any maintenance activity being authorized under this exemption, the activity files shall be thoroughly documented as to the original and proposed line, grade, hydraulic capacity of the drainage features and purpose of the facility.

3. Where there is any question as to the application of this exemption, the appropriate District Hydraulics Engineer should be consulted.

- The normal operational procedures for maintaining the travel surface of unpaved/gravel roadways (i.e., dragging, blading, grading, etc.) have been granted an exemption from the VSMP Construction Permit requirements by DCR. This exemption only applies to maintaining the travel surface and does not include normal ditch cleaning operations to restore hydraulic capacity or pipe replacements. When normal ditch cleaning operations to restore hydraulic capacity or pipe replacements are a part of the maintenance operations for the unpaved/gravel travel surface, the VSMP Construction Permit requirements will be applicable if the maintenance operation disturbs 5 acres or more (including the dragging/blading/grading of the unpaved/gravel travel surface). Additionally, the normal operational procedures for maintaining the travel surface of the gravel roadway (i.e., dragging, blading, grading, etc.) will be subject to the requirements of the Erosion and Sediment Control Regulations if the operation disturbs 10,000 square feet or greater (2,500 square feet or greater in the

area defined as Tidewater, Virginia in the Chesapeake Bay Preservation Act). (See the latest version of IIM-LD-11).

LAND DEVELOPMENT AREA AND LAND DISTURBANCE AREA

- The application for coverage under the VSMP Construction Permit requires the reporting of both the area of land development and the area of land disturbance.

- The area of land development is the total area of the RLDA site including, but not limited to, the area of the right of way, temporary and permanent easements and offsite supporting areas.

- The area of land disturbance is the total area within the land development area that will be disturbed by the proposed activities. Land disturbance, for the purposes of applicability of the VSMP Regulations and the VSMP Construction Permit, is defined as any manmade change to the land surface that potentially changes its runoff characteristics **including** any clearing, grading or excavation associated with the proposed activity. This includes any grading/dragging/blading associated with the maintenance of unpaved/gravel roadways or shoulders.

SUPPORT FACILITIES (ONSITE AND 0FFSITE)

- Support facilities (both those onsite and offsite) associated with the RLDA, such as staging areas, equipment and material storage areas, excavated material disposal areas, borrow areas, etc., and which are to be covered under the VSMP Construction permit for the RLDA, are to be identified in the SWPPP, the ESC Plan and, where applicable, the post construction SWM Plan for the RLDA. The total area and the amount of land disturbance for any such support facilities **shall** be included in the total calculated values for the land development area and the land disturbance area for the RLDA.

  In many instances, the identification of the locations of the support facilities is the responsibility of the contractor or other such person performing the land disturbing activity and the exact location and size of such areas are not known until after the award of the contract for the RLDA and/or after the VSMP Construction Permit registration process has been completed. The estimated area of land development and the area to be disturbed that is reported on the VSMP Construction Permit Registration Information form (LD-445) is to include an estimated quantity for any potential support facilities that will to be identified after the award of the contract, or after the VSMP Construction Permit registration process has been completed, and which will be covered by the VSMP Construction Permit for the proposed land disturbance activity. The approved ESC Plan, post construction SWM Plan (if applicable) and SWPPP for the RLDA will require modification for the inclusion of these areas once they are identified (see the latest version of IIM-LD-11 and IIM-LD-246 for additional information for modifying the approved ESC Plan, post construction

SWM Plan and SWPPP). If the inclusion of the land disturbance area for later identified support facilities results in the land disturbance threshold for the permit fee initially paid being exceeded, then the orginal VSMP Construction Permit Registration assembly must be revised and resubmitted, along with any additional permit fees required as a result of any increase in the land disturbance area, following the same procedures as for the intial permit registration outlined in this document. In the instance where the inclusion of the later identified offsite areas results in the total land development area exceeding that reported in the initial permit registration application, then a **new** permit registration application must be submitted including a **new** permit fee for the total land disturbance area.

- In some instances, where the proposed land disturbance activity does not require coverage under the VSMP Construction Permit (due to the land disturbance area being less than the threshold amounts requiring permit coverage), the additional disturbed area associated with the support activities identified after the award of the contract and/or after the beginning of the proposed land disturbance activity, when combined with the total disturbed area for the initially proposed activity, may necessitate the need for coverage under the VSMP Construction Permit. Once this is determined, any ongoing land disturbance activity shall be halted immediately and shall not begin again until coverage under the VSMP Construction Permit is secured. An ESC Plan, post construction SWM Plan (if applicable) and a SWPPP will need to be prepared for the total area of the RLDA and the VSMP Construction Permit Registration application will need to be processed in accordance with the procedures outlined in this document. Information and instructions for the development and incorporation of erosion and sediment control and post construction stormwater management details into plan assemblies are contained in the latest versions of IIM-LD-11, IIM-LD-195 and Hydraulic Design Advisory 07-01. Information and instructions for the development and incorporation of a SWPPP into plan assemblies is contained in the latest version of IIM-LD-246.

- Having to delay/cease land disturbance activities on an ongoing project to await coverage under the VSMP Construction Permit is not a desirable situation. It is, therefore, imperative that proper attention be given to the estimation of the land development area and land disturbance area for any potential support areas and that such estimates be included with the land development area and land disturbance area for the project when determining the applicability of and the application for the VSMP Construction Permit coverage.

RESPONSIBLE PARTIES

- Project Authority

  Responsible for initiating the VSMP Construction Permit Registration application process. Completes, or coordinates the completion of, all of the information on the VSMP Construction Permit Registration Information form (LD-445) and the VSMP Construction Permit Fee Registration form (LD-445B), attaches the completed ESC & SWM Plan Certification form (LD-445C) and sends the completed assembly for each RLDA to the applicable District VSMP Construction Permit Coordinator.

For the purposes of this IIM, the Project Authority is defined as that person with responsibility for oversight of the preliminary engineering aspects of the RLDA such as the Project Manager, the Residency Contract Administrator, or other such person that manages/oversees the pre-construction activities of the proposed land disturbing activity.

- ESC Plan Designer/Hydraulic Engineer

    1. Responsible for preparing the ESC and SWM Plan for the RLDA in accordance with VDOT's Approved ESC and SWM Standards and Specifications. Develops and ensures that all applicable information is included on the SWPPP General information Sheets (see the latest version of IIM-LD-246). Assists the Project Authority in completing the VSMP Construction Permit Registration Information form (LD-445). Submits the completed Erosion and Sediment Control and Stormwater Management Plan Certification form (LD-445C) to the Project Authority.

- District VSMP Construction Permit Coordinator

    1. Responsible for coordinating the VSMP Construction Permit Registration application process for the District. Collects all of the completed VSMP Construction Permit Registration application assemblies (forms LD-445, LD-445B and LD445C) and submits them to the Central Office VSMP Construction Permit Coordinator. Collects and submits the completed Stormwater Pollution Prevention Plan Certification forms (LD-445E) and the VSMP Construction Permit Termination Notice forms (LD-445D) to the Central Office VSMP Construction Permit Coordinator. Attaches a copy of the VSMP Construction Permit Registration Information form LD-445 to the applicable VSMP Construction Permit coverage letter received from the Central Office VSMP Construction Permit Coordinator and forwards both to the RLD for each specific RLDA. Inputs Permanent BMP data submitted with the VSMP Construction Permit Termination Notice forms (LD-445D) into the L&D Stormwater Database.

    2. The District VSMP Construction Permit Coordinator is the District Drainage Engineer or his/her designee.

- Responsible Land Disturber (RLD)

    Responsible for insuring the implementation of the SWPPP (including the ESC and Post Construction SWM Plan) for the RLDA. Completes, signs, and forwards, to the appropriate District VSMP Construction Permit Coordinator, the SWPPP Certification form (LD-445E), certifying that all contractor supplied information noted on the SWPPP General Information Sheets contained in the construction plan set (or other such documents) will be received and approved and included with the other SWPPP documents for the proposed activity prior to any land disturbance occurring in those areas identified by such information, and the VSMP Construction Permit Termination Notice form (LD-445D), including permanent BMP information, certifying that final stabilization has been achieved on all portions of the RLDA site, that all post construction SWM facilities have been constructed in accordance with their design details and that the post construction SWM facilities are currently operational.

1. The RLD is the VDOT person so identified on form LD-445 and the SWPPP General Information Sheets and satisfies the requirements of DCR's RLD Certification Program. See the latest version of IIM-LD-11 for additional information on DCR's RLD Certification Program.

- Central Office VSMP Construction Permit Coordinator

1. Responsible for compiling all VSMP Construction Permit Registration assemblies statewide and applying to the DCR for coverage under the VSMP General Construction Permit for the impending RLDAs. Submits the VSMP Construction Permit Registration information, registration fees (in the form of an IAT), the VSMP Construction Permit Termination Notice forms (LD-445D) and the SWPPP Certification forms (LD-445E) to DCR. Forwards the VSMP Construction Permit coverage letters (including permit number) received from the DCR to the District VSMP Construction Permit Coordinator. Maintains an online database documenting pertinent information on the RLDAs submitted for VSMP Construction Permit coverage.

2. The Central Office VSMP Construction Permit Coordinator is a designated person in the Central Office Hydraulics Section.

VSMP CONSTRUCTION PERMIT REGISTRATION PROCEDURE

- Coverage under the VSMP Construction Permit must be obtained prior to any land disturbance occurring on any proposed activities that exceed the land disturbance threshold amounts. The land disturbance activity is considered covered by the VSMP Construction Permit 15 business days following the submission of a complete and accurate registration statement (including applicable permit fee) to the DCR unless notification of such coverage is issued earlier by DCR. The registration statement will be considered submitted once it and the appropriate permit fee (in the form of the IAT documentation) have been sent to the DCR by the Central Office VSMP Construction Permit Coordinator.

- On or before the initiation of the PAC process for a RLDA (or other appropriate stage for those activities that do not go through a formal PAC process), the Project Authority shall complete, or have the appropriate person complete, the applicable sections of the VSMP Construction Permit Registration Information form (LD-445) and the VSMP Construction Permit Fee Registration form (LD-445B), attach the ESC and SWM Plan Certification form (LD-445C) and send this assembly to the appropriate District VSMP Construction Permit Coordinator prior to the 21st day of each month (for information regarding the process for completing the LD-445C form see the latest version of IIM-LD-11).

- The District VSMP Construction Permit Coordinator shall review all permit registration assemblies for completeness and forward the completed assemblies to the Central Office VSMP Construction Permit Coordinator on or before the last day of each month. The District VSMP Construction Permit Coordinator will return all incomplete assemblies to the Project Authority for completion and resubmission.

- For Capital Outlay projects, the project authority shall submit the completed permit registration assembly directly to the Central Office VSMP Construction Permit Coordinator in the Central Office Hydraulics Section.

- For PPTA and Design Build projects, the project authority shall submit the completed permit registration assembly to either the District VSMP Construction Permit Coordinator (where the project is being managed in the District) or the Central Office VSMP Construction Permit Coordinator (where the project is being managed in the Central Office).

- The Central Office VSMP Construction Permit Coordinator shall compile all VSMP Construction Permit registration form assemblies received and determine the total fee to be paid to DCR for registering the RLDAs.

- The Central Office VSMP Construction Permit Coordinator shall, by the 7th day of each month, submit the VSMP Construction Permit Registration Application information for all proposed activities to DCR including the IAT documentation for the combined permit registration fees. At the request of DCR, these transactions will only occur on a once a month basis. However, if necessitated by an emergency or other similar situation, permit coverage can be obtained from DCR at other times. An emergency or other similar situation is defined as one which requires immediate attention due to liability or safety concerns.

- Once DCR receives the registration application information and appropriate IAT documentation for the permit fees, they will issue a registration statement to the Central Office VSMP Construction Permit Coordinator with a project specific permit number for each RLDA. The Central Office VSMP Construction Permit Coordinator will forward the RLDA registration statements to the appropriate District VSMP Construction Permit Coordinator or Capital Outlay/PPTA/Design Build Project Authority

- The District VSMP Construction Permit Coordinator or Capital Outlay/PPTA/Design Build Project Authority shall attach a copy of the VSMP Construction Permit Registration Information form LD-445 to each applicable RLDA registration statement received and distribute both to the appropriate RLD.

- The Central Office VSMP Construction Permit Coordinator shall submit copies of the LD-445B forms to the Central Office Location and Design Administrative Section in order to debit the appropriate permit registration fees from each specific RLDA.

- The Central Office VSMP Construction Permit Coordinator shall maintain an online database documenting the registered RLDAs and shall retain, on file, copies of the VSMP Construction Permit Registration Application information for a period of not less than 3 years after the completion of the RLDA and the termination of the VSMP Construction Permit coverage.

- The VSMP Construction Permit Registration Application for any RLDA missing any of the submission cutoff dates (i.e., to District or Central Office VSMP Construction Permit Coordinator) will be carried over to the next month's submission to DCR.

CONDITIONS OF COVERAGE UNDER THE VSMP CONSTRUCTION PERMIT

- The SWPPP (see the latest version of IIM-LD-246), along with a copy of the VSMP General Construction Permit, the VSMP Construction Permit Registration Information form LD-445 and the VSMP Construction Permit registration statement showing the permit number, must be retained on the site of the RLDA from the commencement of any land disturbance activity to the date of final stabilization and permit coverage termination. Where no facilities are available at the activity site to maintain these documents, they are to be kept by or with the designated RLD at a location convenient to the activity site where they would be readily available for review upon request during normal business working hours. Where the SWPPP documents are not stored on-site, a copy of such documents, except for the ESC and SWM engineering calculations and documentation, shall be in the possession of those with day to day operational control over the implementation of the SWPPP (e.g. the RLD, ESC Inspector, etc.) whenever they are on site. A copy of the VSMP General Construction Permit may be obtained from the DCR website at http://www.dcr.virginia.gov/soil_and_water/documents/vsmpgenpermvar10.pdf

- The VSMP General Construction Permit requires that the SWPPP be made available for review upon the request of the DCR, the EPA, local government officials or the operator of a municipal separate storm sewer system (MS4) receiving discharge from the construction site.

- The VSMP General Construction Permit requires that a copy of the General Permit coverage letter (registration statement) and the name and contact information for the VDOT person responsible for the land disturbing activity and the SWPPP be posted at a publicly accessible location at the construction site. The LD-445A form is to be used to identify the name and contact information for VDOT responsible person (typically the designated RLD for the activity). The General Permit coverage letter (registration statement) and the LD-445A form are to be posted outside the project's construction office along with other Federal and State mandated information. Where there is no construction office (e.g., a maintenance activity), the permit coverage letter (registration statement) and LD-445A form are to be maintained with the other SWPPP documents for the land disturbing activity.

- For those land disturbing activities requiring coverage under the VSMP General Construction Permit on or after July 1, 2009, and which have not been previously covered by a VSMP General Construction Permit, the VSMP Construction Permit requires that the SWPPP be made available for review by the public upon request. Such reviews shall be at a time and publicly accessible location convenient to the VDOT and shall be scheduled during normal business hours and no less than once a month.

- Any modifications to the approved SWPPP (including the ESC and post construction SWM Plan) must be implemented in accordance with Section 107.16(e) of the 2007 VDOT Road and Bridge Specifications, the VDOT's Approved ESC and SWM Standards and Specifications, and the procedures outlined in the latest version of IIM-LD-11 and IIM-LD-246.

PROCEDURE FOR TERMINATING COVERAGE UNDER THE VSMP CONSTRUCTION PERMIT

- Upon completion of the RLDA (i.e., all areas are stabilized and all post construction stormwater management facilities are operational), the RLD shall add the "In Service Date" for each BMP on the Permanent BMP table in Section VI of the SWPPP General Information Sheets for the land disturbing activity and complete and sign the VSMP Construction Permit Termination Notice form (LD-445D). The LD-445D form along with a copy of the Permanent BMP table (with In Service Date shown) is to be submitted to the appropriate District VSMP Construction Permit Coordinator prior to the 21st day of the month.

- The District VSMP Construction Permit Coordinator shall enter the permanent BMP information into the L&D Stormwater Data Base and then sign and forward all original LD-445D forms and copies of the Permanent BMP information to the Central Office VSMP Construction Permit Coordinator on or before the last day of each month. The District Maintenance Engineer and the Central Office Maintenance Division Administrator shall be copied on all such information.

- The Central Office VSMP Construction Permit Coordinator shall compile all LD-445D forms received and forward the VSMP Construction Permit termination information and Permanent BMP information to DCR by the 7th day of each month.

- The Central Office VSMP Construction Permit Coordinator will retain a copy of the permit termination information on file for a period of not less than 3 years after the completion of the RLDA and record the effective termination date in the online database.

FORMS

- LD-445 VSMP Construction Permit Registration Information
- LD-445A VSMP Construction Permit Contact Information
- LD-445B VSMP Construction Permit Fee Registration
- LD-445C ESC and SWM Plan Certification
- LD-445D VSMP Construction Permit Termination Notice
- LD-445E Stormwater Pollution Prevention Plan (SWPPP) Certification

L&D forms are available through the VDOT website and can be downloaded at the following link: http://vdotforms.vdot.virginia.gov/

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: RURAL RUSTIC ROAD PROJECTS	NUMBER: IIM-LD-245
SPECIFIC SUBJECT: Virginia Stormwater Management Program (VSMP) Construction General Permit and Virginia Erosion and Sediment Control (ESC) Regulation Requirements	DATE: SEPTEMBER 12, 2008
	SUPERSEDES:
DIVISION ADMINISTRATOR APROVAL:	Mohammad Mirshahi, P.E. State Location and Design Engineer Approved September 10, 2008

EFFECTIVE DATE

- These instructions are effective upon receipt.

INTRODUCTION

- The Rural Rustic Road Program was developed as a means to pave Virginia's low volume unpaved roads while ensuring environmental and financial stewardship. Legislation enacted by the 2002 session of the General Assembly and amended by the 2003 session provided that this construction method would be considered as a first alternative for improving all unpaved roads in the Commonwealth.

- The Guidelines For Rural Rustic Road Program developed by the Local Assistance Division and the Rural Rustic Road Policy Committee can be found at: http://www.virginiadot.org/info/resources/RuralRusticProgram.pdf

  These guidelines define the eligibility criteria and approval process for candidate projects.

- Ideally, Rural Rustic Road Projects:

  - Provide a paved travelway width that approximates the existing gravel width (For roadways with an excess of 400 vpd, an 18' paved surface is desirable).
  - Require no improvements to the existing horizontal or vertical alignment.
  - Require roadside ditch work only to reestablish existing line, grade or hydraulic capacity, provide positive drainage or address safety concerns.

- o Require drainage pipe work to extend existing structures, replace structurally deficient structures or address safety concerns.
- o Do not change the characteristics of the stormwater run–off leaving the project site, i.e., no increase in peak rates of flow, volume or velocity.

POLICY

- Rural Rustic Road projects that disturb one acre (2,500 square feet in designated Chesapeake Bay Preservation Areas) or greater must obtain coverage under the Virginia Stormwater Management Program (VSMP) Permit for discharges of stormwater from construction activities. One of the many requirements of the VSMP Construction Permit is the development of a project specific Stormwater Pollution Prevention Plan (SWPPP). For more information about a SWPPP, see Road and Bridge Specification 107.16(e) and IIM-LD-246 (Under Development).

- Rural Rustic Road projects that disturb 10,000 square feet (2,500 square feet in localities define as Tidewater, Virginia in the Chesapeake Bay Act) or greater must have an Erosion and Sediment Control (ESC) Plan and must comply with VDOT's Approved ESC and SWM Standards and Specifications. A part of that compliance is adherence to Minimum Standard (MS) 19 of the Virginia ESC Regulations. MS19 contains criteria for documenting adequacy of all off-site outfall channels for capacity and erosion protection. MS19 also contains requirements for adequate onsite drainage facilities. That requirement mandates that such drainage facilities have the capacity to convey the run-off from a 10 year storm event.

- Any grading, filling, scarifying or manipulation of the surface of the existing gravel travelway is to be included in the calculation for total land disturbance for the purposes of determining the application of the ESC Regulations and VSMP Construction Permit. This requirement is applicable regardless of the nature of the activity (i.e., construction or maintenance).

- By law and published guidelines, Rural Rustic Road projects do not meet the intent of MS19 for onsite drainage facilities, as such facilities on Rural Rustic Road projects are only improved as necessary to reestablish existing line, grade or hydraulic capacity, provide positive drainage or address safety concerns. As a result, the Rural Rustic Road projects are considered a special classification of land disturbing activities. They will be considered meeting MS19 provided **all** of the following criteria are met:

  1. There will be no increase in impervious area as a result of the project (i.e., the proposed paved area will approximate the existing compacted gravel area).
  2. There will be no improvements to the existing horizontal or vertical alignment.
  3. Roadside ditch work will only be performed as necessary to reestablish existing line, grade or hydraulic capacity, provide positive drainage or address safety concerns.
  4. Drainage pipe work will only be performed as necessary to extend existing structures, replace structurally deficient structures or address safety concerns.
  5. There will be no change in the characteristics of the stormwater run–off leaving the project site, i.e., no increase in peak rates of flow, volume or velocity.

6. There will be no increase in the number of concentrated flow discharge points and the existing drainage patterns between the concentrated flow discharge points will remain the same.
7. The project files will be thoroughly documented with regards to the project meeting the requirements of items 1 through 6.
8. A Department of Conservation and Recreation (DCR) Certified Erosion and Sediment Control Plan Reviewer or Professional Engineer with expertise in the field of ESC and SWM shall certify that the project meets the requirements of items 1 through 7. This is accomplished by the Plan Reviewer completing the appropriate sections of Form LD-445C as a part of the overall review and approval process for the erosion and sediment control plan for the project.

- Projects not meeting the above requirements must either provide adequate (10 year design) for onsite drainage facilities or request a project specific Variance from DCR. Instructions for submitting a project specific variance can be found in the latest version of IIM-LD-11.

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: STORMWATER POLLUTION PREVENTION PLAN	NUMBER: IIM-LD-246.2
SPECIFIC SUBJECT: STORMWATER POLLUTION PREVENTION PLAN DOCUMENTS AND COMPONENTS	DATE: MARCH 19, 2010
	SUPERSEDES: IIM-LD-246.1
DIVISION ADMINISTRATOR APPROVAL:	Mohammad Mirshahi, P.E. State Location and Design Engineer Approved March 19, 2010

Changes are shaded.

CURRENT REVISION

- Instructions for the development of the Stormwater Pollution Prevention Plan, General Information Sheets and Certification Form LD-445E have been revised to clarify the Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities (VSMP Construction Permit) requirements.

EFFECTIVE DATE

- These instructions are effective upon receipt.

ACRONYMS

- ESC – Erosion and Sediment Control
- RLD – Responsible Land Disturber
- R&B – Road and Bridge
- SWM – Stormwater Management
- SWPPP – Stormwater Pollution Prevention Plan
- VDOT – Virginia Department of Transportation
- VSMP – Virginia Stormwater Management Program

1.0 BACKGROUND

1.1 Section 107.16 (e) of the 2007 VDOT R&B Specifications requires all land disturbance activities that disturb 10,000 square feet or greater (2500 square feet or greater in the area defined as Tidewater, Virginia in the Chesapeake Bay Preservation Act) (see the latest version of IIM-LD-11) to have a SWPPP.

1.2 The VSMP General Permit for the Discharge of Stormwater from Construction Activities (hereafter referred to as the VSMP Construction Permit) also requires a SWPPP for activities covered under that permit. While a SWPPP is an important component of the VSMP Construction Permit, it is only one of the many requirements that must be addressed in order to be in full compliance with the conditions of the permit. Those persons who oversee or perform activities covered by the VSMP Construction Permit must review and understand all of the conditions and requirements contained within that permit.

2.0 SWPPP APPLICABILITY AND REQUIREMENTS

2.1 A SWPPP identifies potential sources of pollutants which may reasonably be expected to affect the stormwater discharges from land disturbing activity sites and any off site support areas and describes and ensures implementation of practices which will be used to reduce pollutants in such discharges.

2.2 The required contents of a SWPPP for those land disturbance activities requiring coverage under the VSMP Construction Permit are found in Section II D. of the General Permit section of the VSMP Regulations (4VAC50-60-1170).

2.3 Except for the items dealing with the post construction stormwater management requirements, the majority of the items that must be addressed in the SWPPP for land disturbance activities requiring VSMP Construction Permit coverage must also be addressed for those land disturbance activities that do not require VSMP Construction Permit coverage but do require an ESC Plan in accordance with the requirements of the Virginia ESC Law and Regulations.

2.4 When the land disturbing activity requires coverage under the VSMP Construction Permit, the SWPPP must also include a copy of the VSMP Construction Permit, the VSMP Construction Permit Registration Information form LD-445, the SWPPP Certification form LD-445E and the VSMP Construction Permit coverage letter received from DCR showing a project specific registration number.

2.5 The SWPPP is to include any off site support facilities used exclusively for the land disturbance activity (e.g., borrow and disposal sites, the contractor's storage and fueling areas, etc.).

2.6 For those land disturbance activities requiring coverage under the VSMP Construction Permit, Section II B.1. of the General Permit section of the VSMP Regulations (4VAC50-60-1170) requires the SWPPP to be signed by a person so identified in Section III K.2 of that same document. For a State Agency, that person is the principal executive officer or his designee.

2.7 Many of the items required in the SWPPP are typically contained in the construction plans (or other such documents) by means of the erosion and sediment control plans, post construction stormwater management plans, etc. and in other VDOT documents such as the R&B Standards and Specifications which can be incorporated into the SWPPP by reference.

3.0 LD-445E

3.1 For those land disturbance activities requiring coverage under the VSMP Construction Permit, the Permit requires that the SWPPP for any covered off site support facilities to be developed and included with the SWPPP for the primary land disturbance activity prior to issuance of permit coverage.

3.2 On most VDOT land disturbing activities, it is the responsibility of the contractor or other such person performing the land disturbance activity to identify the location of the off site support facilities and provide the stormwater pollution prevention plan for such to the project engineer/RLD for review and approval.

3.3 Since the VSMP Construction Permit coverage for VDOT land disturbance activities is normally obtained prior to the identification of the off site support areas, a mechanism is required whereby the project files can be documented and DCR can be assured that all of the information for the off site support facilities, as well as other required information not available at the time the VSMP Construction Permit coverage is applied for, has been or will be included in the SWPPP for the land disturbance activity. The mechanism to be used for this purpose will be SWPPP Certification Form LD-445E.

3.3.1 Form LD-445E is also to be used to identify the VDOT person responsible for the inspection of the erosion and sediment control facilities.

3.3.2 The DCR has approved the signature of the RLD on the LD-445E form as meeting the SWPPP signatory requirements contained in Section II B.1. of the General Permit section of the VSMP Regulations (4VAC50-60-1170).

3.3.3 Form LD-445E is to be completed by the RLD for **all** regulated land disturbing activities requiring VSMP Construction Permit Coverage and/or an ESC Plan/SWPPP.

3.3.4 A copy of completed form LD-445E is to be retained with the other SWPPP documents for the land disturbance activity.

3.3.5 For those land disturbing activities requiring coverage under the VSMP Construction Permit, the completed LD-445E form is to be forwarded to the District VSMP Construction Permit Coordinator for inclusion with other VSMP Construction Permit data that is forwarded monthly to the Central Office VSMP Construction Permit Coordinator.

4.0 SWPPP GENERAL INFORMATION SHEETS

4.1 In order to provide a clear understanding of what is required in a SWPPP and to provide a reference as to where those items are located within the contract/construction documents, a set of SWPPP General Information Sheets has been developed. The SWPPP General Information Sheets provide a summary of the information required in Section II D. of the General Permit section of the VSMP Regulations (4VAC50-60-1170) and, where not included on the General Information Sheets, provide a reference to where that information can be found within the contract/construction documents for the land disturbance activity (e.g., the construction plans or other such documents, the VDOT R&B Standards and/or Specifications, contractor supplied documents, etc.).

4.2 The SWPPP General Information Sheets incorporate many of the notes previously included in the ESC General Notes as well as those necessary to identify and describe the post construction stormwater management plan for the land disturbance activity (if applicable).

4.3 The SWPPP General Information Sheets are to be included in the plan set (or other such documents) for all land disturbance activities requiring a VSMP Construction Permit and/or an erosion and sediment control plan. Completion and inclusion of the SWPPP General Information Sheets in the contract documents satisfies one of the many requirements contained in the VSMP Construction Permit. Those persons who oversee or perform activities covered by the VSMP Construction Permit must review and understand all of the conditions and requirements contained within that permit.

4.4 The SWPPP General Information Sheets are updated from time to time to clarify and/or include additional requirements as a result of changes to the VSMP Construction Permit and/or the VDOT's Approved ESC and SWM Standards and Specifications. Prior to finalization of the construction plans or other such documents for a proposed land disturbance activity, the Project Manager or other such project authority is to verify that the most recent SWPPP General Information Sheets are included.

4.5 The SWPPP General Information Sheets have been developed in two formats as follows:

4.5.1 Available in the CADD sheet 2000 cell library (referenced as SWPPP1, SWPPP2 & SWPPP3) for use with those land disturbance activities that have a formal set of construction plans (i.e., those developed under a Minimum (M) Plan or Complete (C) Plan Process).

4.5.2 Available in Falcon under the Engineering Services' eng-scr directory (No Plan sub-directory) as an 8.5 X 11 word document for use with those land disturbance activities developed under a No (N) Plan Process or for maintenance activities.

4.6 The SWPPP General Information Sheets are to be completed by the ESC Plan Designer, the Hydraulic Engineer or other such person who has the responsibility for developing the ESC and post construction SWM Plan (if applicable) for the land disturbance activity.

4.7 Information required by those notes on the SWPPP General Information Sheets designated with an asterisk is to be supplied/completed by the contractor or the VDOT RLD, as appropriate.

4.8 All information/notes in Sections I through VI of the SWPPP General Information Sheets are applicable to land disturbance activities requiring coverage under the VSMP Construction Permit.

4.9 For land disturbance activities not requiring coverage under the VSMP Construction Permit but requiring an ESC Plan, some information noted on the SWPPP General Information Sheets, specifically that in Section IV (notes 2 through 6) and Sections V and VI, may not be required. Those notes/information not applicable to a specific land disturbance activity should be noted as "Not applicable to this land disturbance activity".

4.10 For those activities requiring coverage under the VSMP Construction Permit, Section V of the SWPPP General Information Sheets requires a location map that **clearly** identifies the project location and all surface waters (including names where applicable), such as rivers, streams, lakes, ponds, etc., within a one mile radius of the project site.

4.10.1 Instructions for placing a location map in Section V can be found at the following web address:

4.10.1.1 For projects with a formal set of construction plans:
http://www.virginiadot.org/business/locdes/LDHydraulics.asp

4.10.1.2 For No Plan projects or maintenance activities:
http://www.virginiadot.org/business/locdes/LDHydraulics.asp

4.10.2 Those unable to access the noted sites should contact the District or Central Office Hydraulics Section, as appropriate.

4.10.3 Other methods that produce the desired map may be used in lieu of those noted.

4.11 Except for the “In Service Date”, the permanent BMP information (when applicable) in Section VI is to be completed by the Hydraulic Engineer (or other such person developing the post construction SWM Plan) and is to be based on the pre-construction design. This information is to be updated if, and as, any changes to the post construction SWM Plan are authorized during the construction phase of activity. Such changes are to be made as a formal revision to the plans. When submitting a request for termination of the VSMP Construction Permit coverage, the RLD is to add the date that the facility was placed into service as a permanent BMP to the other information in the Permenant BMP table and attach a copy of this table to the LD-445D form.

4.12 Some of the notes on the General Information Sheets require project specific user input. Some examples of the information required are as follows:

4.12.1 Section I General

4.12.1.1 Note 1 - Activity Description (Examples)

- This roadway construction project consists of adding two additional parallel lanes to an existing two lane rural roadway facility.
- This roadway construction project consists of improving an existing urban roadway intersection by adding left turn and right turn lanes.
- This roadway construction project consists of replacement of an existing bridge with a new bridge and improvements to the existing roadway approaches.
- This roadway construction project consists of widening an existing urban street and adding additional turn lanes.
- This roadway maintenance project consists of re-grading and enlarging the roadside ditches and replacing drainage pipes along an existing rural roadway.
- This roadway maintenance project consists of re-grading the roadside ditches and replacing deteriorated drainage pipes along an existing rural roadway in order to reestablish original grade and/or hydraulic capacity.

4.12.1.2 Note 6 - Critical Areas (Example)

- There is one farm pond located 1500’ north of Station 29+00 Route 602 and an existing perennial stream located 1000’ east of and parallel to Route 55 between Stations 204+00 and 212+00.

4.12.2 Section II Erosion and Sediment Control

4.12.2.1 Note 1 - Variances (Example)

- A variance to decrease the height of silt fence to 26” approved by letter from the Department of Conservation and Recreation’s Abingdon Office dated July 15, 2006.

5.0 SWPPP DOCUMENTS

5.1 For VDOT land disturbance activities, the required documents for a SWPPP shall include, but are not limited to:

1. The construction plans/documents.
2. The SWPPP General Information Sheets (with all notes completed with appropriate information).
3. The ESC Plan.
4. The post construction SWM Plan (if applicable).
5. The VDOT R&B Standards and Specifications, Supplemental Specifications, Special Provisions and Special Provision Copied Notes.
6. A copy of the VSMP General Permit For Discharges Of Stormwater From Construction Activities (Construction Permit) (when applicable).
7. A copy of the VSMP Construction Permit coverage letter received from DCR (when applicable).
8. A copy of the VSMP Construction Permit Registration Information form LD-445, (when applicable).
9. A copy of the SWPPP Certification form LD-445E
10. Documents required to be developed by the contractor for erosion and sediment control and stormwater pollution prevention associated with any support facilities.
11. All ESC inspection reports.
12. All ESC and SWM design computations and supporting data.

5.2 All documents related to the SWPPP for a land disturbance activity (except for the ESC and SWM design computations and supporting data) shall be maintained at the activity site and shall be readily available for use by those with SWPPP implementation responsibilities. All documents related to the SWPPP for a land disturbance activity shall be readily available for review by others upon request during normal working business hours. SWPPP related information not included in the construction plans/documents, the VDOT R&B Standards, Specifications, Supplemental Specifications, Special Provisions or Special Provision Copied Notes and the ESC and SWM design computation files is to be kept in a separate paper and/or electronic file. Where no facilities are available at the activity site to maintain the SWPPP documents, they are to be kept at a location convenient to the activity site where they will be readily available for use by those with SWPPP implementation responsibilities and would be available for review by others upon request during normal business working hours. Where the SWPPP documents are not stored on-site, a copy of such documents, except for the ESC and SWM engineering calculations and documentation, shall be in the possession of those with day to day operational control over the implementation of the SWPPP (e.g. the RDL, ESC Inspector, etc.) whenever they are on site.

6.0 SWPPP COMPONENTS

6.1 The following includes the major components of a SWPPP, the person(s) responsible for ensuring that the component is addressed in the SWPPP for a specific land disturbing activity and how that component is addressed in the construction plans or other such documents for a VDOT land disturbing activity.

6.1.1 A copy of the VSMP Construction Permit registration statement and coverage letter (when applicable).

- The designated RLD ensures that a copy of the VSMP Construction Permit Registration Information form LD-445, a copy of the SWPPP Certification Form LD-445E and the VSMP Construction Permit coverage letter received from DCR is maintained in the SWPPP file.

6.1.2 A copy the VSMP Construction Permit (when applicable).

- The designated RLD ensures that a copy is maintained in the SWPPP file.

6.1.3 A narrative description of the nature of the construction activity, including the function of the project.

- The ESC Plan Designer incorporates project specific information into appropriate note(s) on the SWPPP General Information Sheets.

6.1.4 The intended sequence and timing of activities that disturb soils at the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation).

- The Contractor or other such person develops/supplies project specific information. The designated RLD ensures that the information is maintained in the SWPPP file.

6.1.5 A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated.

- The Contractor or other such person develops/supplies project specific information. The designated RLD ensures that the information is maintained in the SWPPP file.

6.1.6 Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities including off-site borrow and fill areas.

- The ESC Plan Designer obtains the information and incorporates it into the appropriate note on the SWPPP General Information Sheets.

6.1.7 A description of any other potential pollutant sources, such as vehicle fueling, storage of fertilizers or chemicals, sanitary waste facilities, etc.

- The Contractor or other such person develops/supplies project specific information. The designated RLD ensures that the information is maintained in the SWPPP file.

6.1.8 Identification of the nearest receiving waters at or near the construction site that will receive discharges from disturbed areas of the project.

- The ESC Plan Designer determines the information and incorporates it into the appropriate note on the SWPPP General Information Sheets.

6.1.9 The location and description of any discharge associated with industrial activity other than construction at the site. This includes stormwater discharges from dedicated asphalt plants and dedicated concrete plants that are covered by the VSMP Construction Permit for the project.

- This information is covered by a standard note on the SWPPP General Information Sheets.

6.1.10 A legible general location map (e.g., USGS quadrangle map, a portion of a city or county map, or other map) with sufficient detail to identify the location of the construction activity and surface waters within one mile of the construction activity.

- The ESC Plan Designer or the Hydraulic Engineer develops and incorporates the location map into Section V of the SWPPP General Information Sheets.

6.1.11 A legible site map/plan identifying the following:

6.1.11.1 Directions of stormwater flow and approximate slopes anticipated after major grading activities.

- The ESC Plan Designer ensures that the appropriate information (e.g., grading contours, typical sections, profiles and/or cross sections) is included in the construction plans or other such documents.

6.1.11.2 Areas of soil disturbance and areas of the site which will not be disturbed.

- The ESC Plan Designer ensures that the appropriate information (e.g., plan view construction limits and/or typical sections/cross sections) is included in the construction plans or other such documents.

6.1.11.3 Locations of major structural and nonstructural control measures identified in the SWPPP, including those that will be permanent after construction activities have been completed.

- The ESC Plan Designer ensures that the appropriate information is included in the construction plans or other such documents.

6.1.11.4 Locations where stabilization practices are expected to occur.

- The ESC Plan Designer ensures that the appropriate information (e.g., plan view construction limits and/or typical sections/cross sections) is included in the construction plans or other such documents.

6.1.11.5 Locations of surface waters.

- The ESC Plan Designer ensures that the appropriate information is included in the construction plans or other such documents.

6.1.11.6 Locations where concentrated stormwater discharges from the construction site.

- The ESC Plan Designer ensures that the appropriate information is included in the construction plans or other such documents.

6.1.11.7 Locations of off-site material, waste, borrow or equipment storage areas covered by the SWPPP.

- The Contractor or other such person supplies project specific information. The designated RLD ensures that the information is maintained in the SWPPP file.

6.1.11.8 Locations of other potential pollutant sources, such as vehicle fueling, storage of chemicals, concrete wash-out areas, sanitary waste facilities, including those temporarily placed on the construction site, etc.

- The Contractor or other such person supplies project specific information. The designated RLD ensures that the information is maintained in the SWPPP file.

6.1.11.9 Areas where final stabilization has been accomplished.

- The Contractor or other such person supplies project specific information. The designated RLD ensures that the information is maintained in the SWPPP file.

6.1. 12 The SWPPP shall include a description of all control measures that will be implemented as part of the construction activity to minimize pollutants in stormwater discharges. For each major construction activity identified, the SWPPP shall clearly describe appropriate control measures, the general sequencing during the construction process in which the control measures will be implemented, and which operator is responsible for the control measure's implementation.

- The ESC Plan Designer develops ESC Plan and SWPPP for inclusion in the construction plans/documents. The Contractor or other such person provides proposed revisions to ESC Plan and SWPPP as necessary to meet differing field conditions or construction sequencing. The VDOT ESC Inspector reviews and the RLD approves any changes to ESC Plan and SWPPP. The RLD ensures that all required information is maintained in the SWPPP file in accordance with Section 107.16(e) of the 2007 Road and Bridge Specifications.

6.1.13 The SWPPP shall include a description of, and all necessary calculations supporting, all erosion and sediment control measures that will be installed during the construction process to control pollutants in stormwater discharges from the construction site.

- The ESC Plan Designer develops ESC Plan and required calculations. The ESC Plan is incorporated into the construction plans/documents. The ESC calculations are maintained in the project hydraulic files and the location of such files is documented by the ESC Plan Designer in the appropriate note on the SWPPP General Information Sheets.

6.1.14 The SWPPP shall describe measures to prevent the discharge of solid materials, including building materials, garbage, and debris to state waters, except as authorized by a Clean Water Act § 404 permit.

- This information covered by a standard note on the SWPPP General Information Sheets.

6.1.15 The SWPPP shall describe control measures used to comply with applicable state or local waste disposal, sanitary sewer or septic system regulations.

- This information covered by a standard note on the SWPPP General Information Sheets.

6.1.16 The SWPPP shall include a description of construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP shall also include a description of controls including storage practices, to minimize exposure of the materials to stormwater, and for spill prevention and response.

- The Contractor or other such person develops/supplies project specific information. The designated RLD reviews and approves the information and ensures that copies of such are maintained in the SWPPP file.

6.1.17 The SWPPP shall include a description of, and all necessary calculations supporting, all post-construction stormwater management measures that will be installed prior to the completion of the construction process to control pollutants in stormwater discharges after construction operations have been completed.

- The Hydraulic Engineer develops the post construction SWM Plan and required calculations. The post construction SWM Plan is incorporated into the construction plans/documents. The post construction SWM calculations are maintained in the project hydraulic files and the location of such files is documented by the Hydraulic Engineer in the appropriate note on the SWPPP General Information Sheets.

6.1.18 The SWPPP shall include a description of pollutant sources from off-site support areas and a description of control measures that will be implemented at those sites to minimize pollutant discharges.

- The Contractor or other such person develops/supplies project specific information. The designated RLD reviews and approves the information and ensures that copies of such are maintained in the SWPPP file.

6.1.19 The name and phone number of qualified personnel conducting the ESC inspections shall be included in the SWPPP.

- The VDOT RLD provides the appropriate information on SWPPP Certification form LD-445E and ensures a copy is maintained in the SWPPP file.

6.1.20 A report summarizing the scope of the ESC inspections, names and qualifications of personnel making the inspections, the dates of the inspections, major observations relating to the implementation of the SWPPP, and any actions taken.

- The Contractor's Erosion and Sediment Control Contractor Certified (ESCCC) person conducts initial inspections and completes the Construction Runoff Control Inspection Form C-107. The VDOT Certified ESC Inspector verifies inspection information on Form C-107 and the RLD ensures that all of the C-107 forms are maintained in the SWPPP file.

6.1.21 The pollutant identified in a Waste Load Allocation (WLA) as of the effective date of the VSMP Construction Permit must be specified in the SWPPP. The SWPPP shall include strategies and control measures to ensure consistency with the assumptions and requirements of the Total Maximum Daily Load (TMDL) WLA that apply to the operator's discharge.

- The ESC Plan Designer incorporates pollutant information into the appropriate note on the SWPPP General Information Sheets and ensures that the ESC and post construction SWM Plans consider requirements of the TMDL WLA.

7.0 FORMS

7.1 LD-445	VSMP Construction Permit Registration Information
7.2 LD-445D	VSMP Construction Permit Termination Notice
7.3 LD-445E	Stormwater Pollution Prevention Plan (SWPPP) Certification
7.4 C-107	Construction Runoff Control Inspection Form